TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

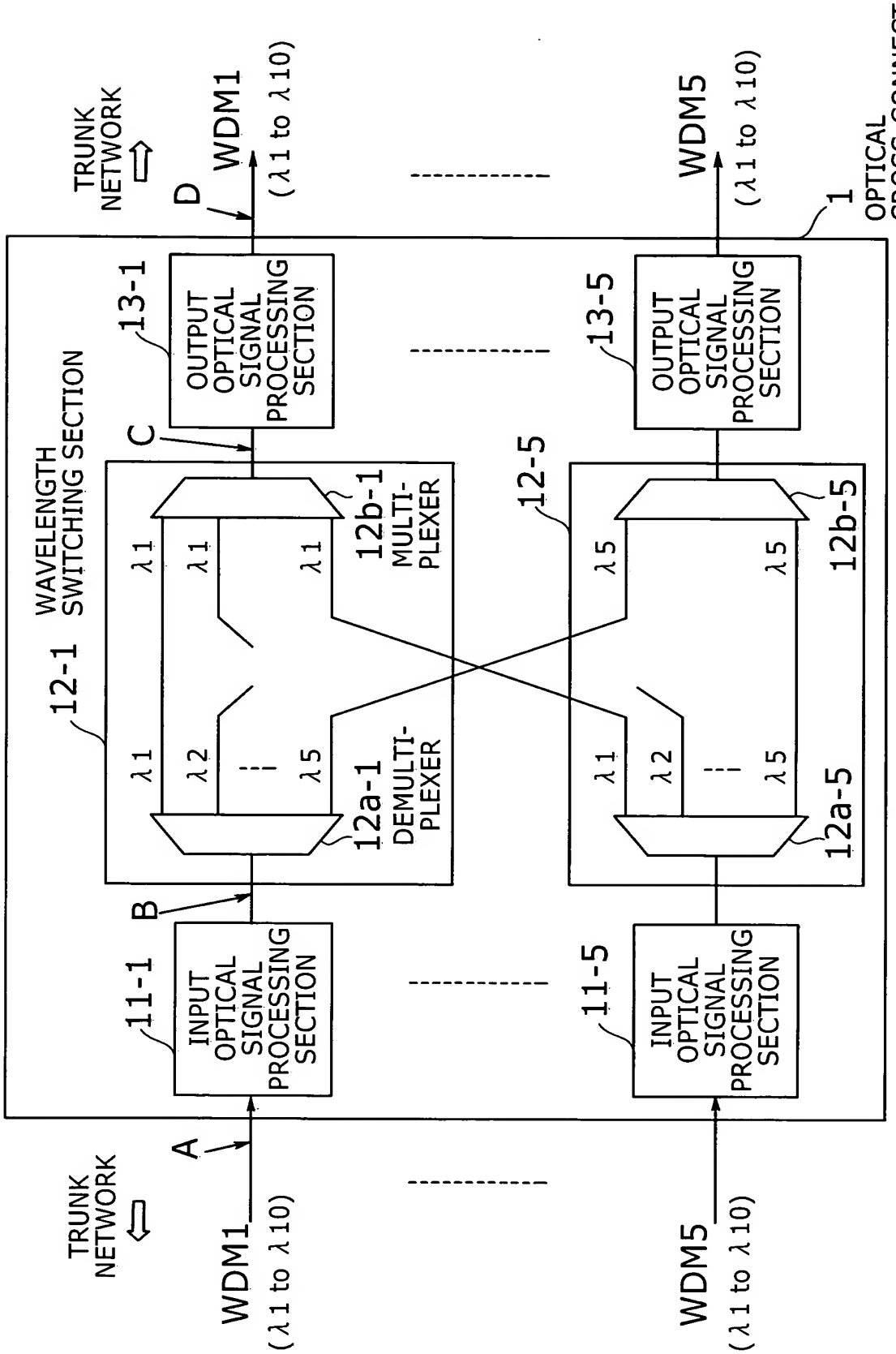

FIG. 1

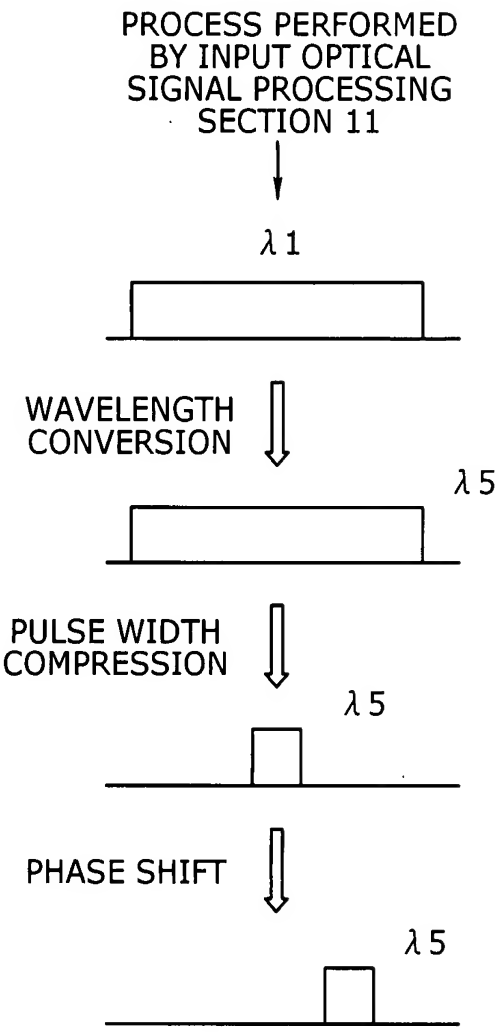

FIG. 2(A)

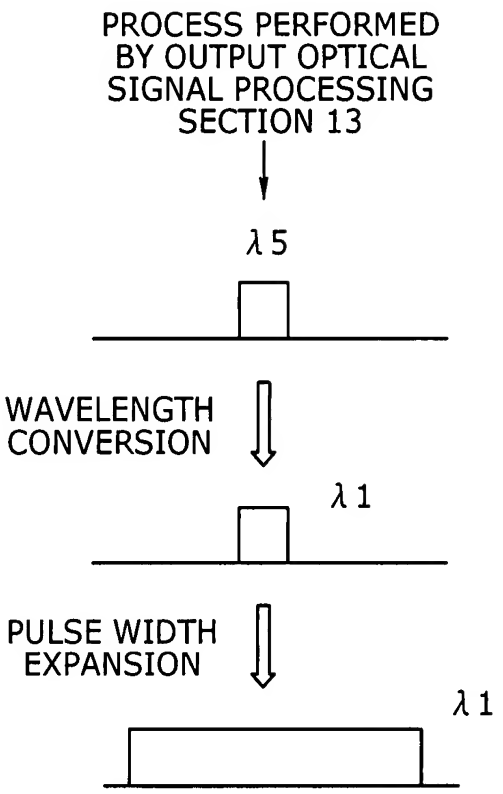

FIG. 2(B)

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
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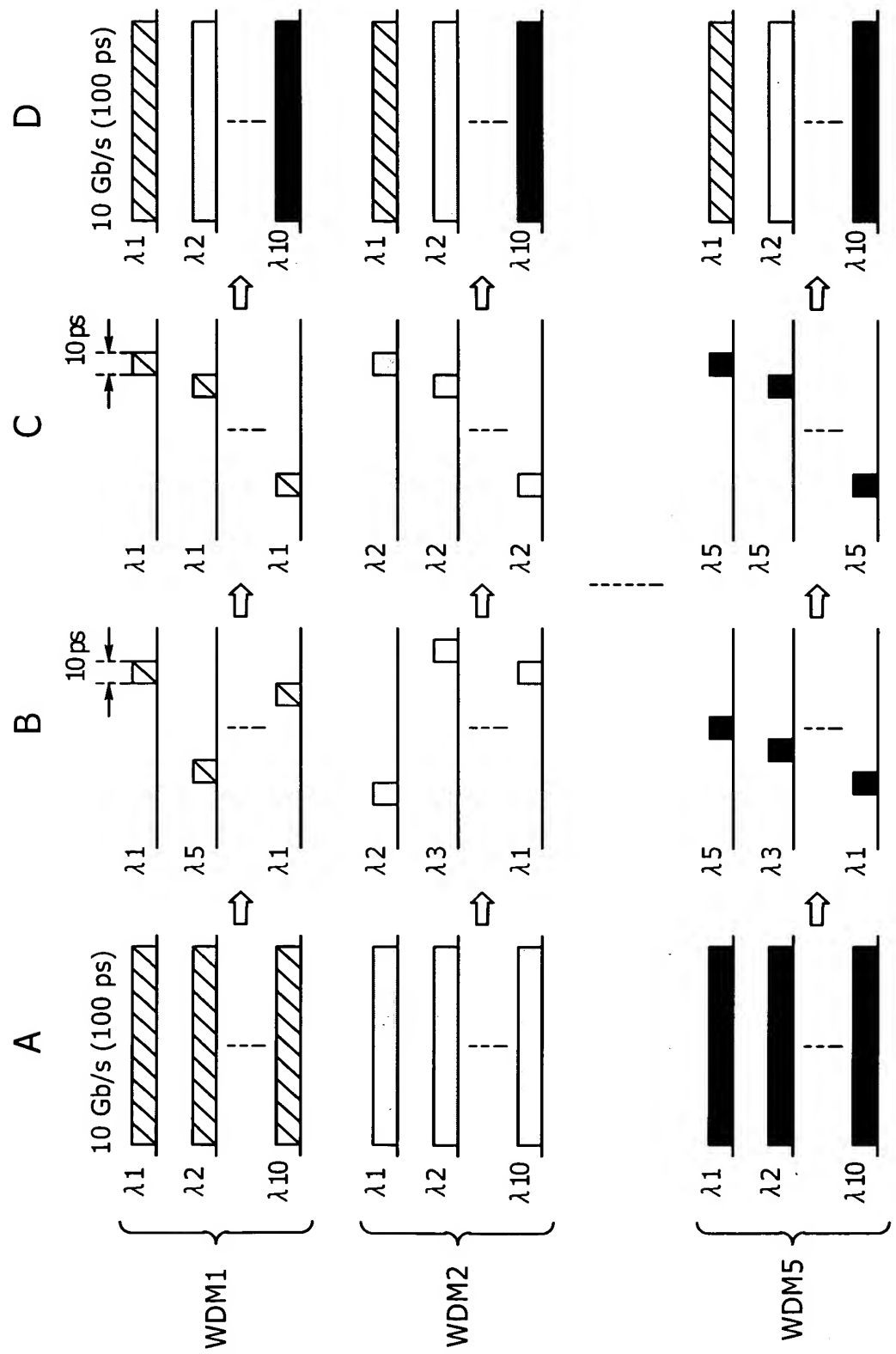


FIG. 3

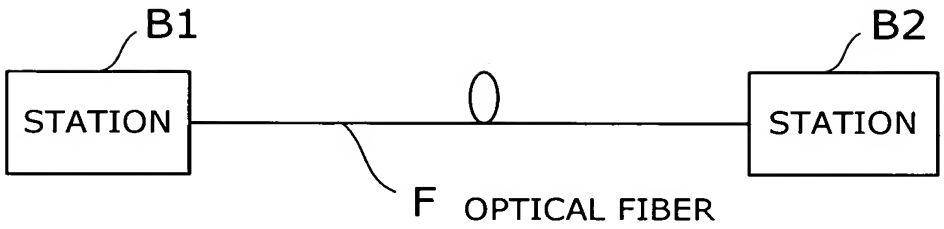


FIG. 4

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

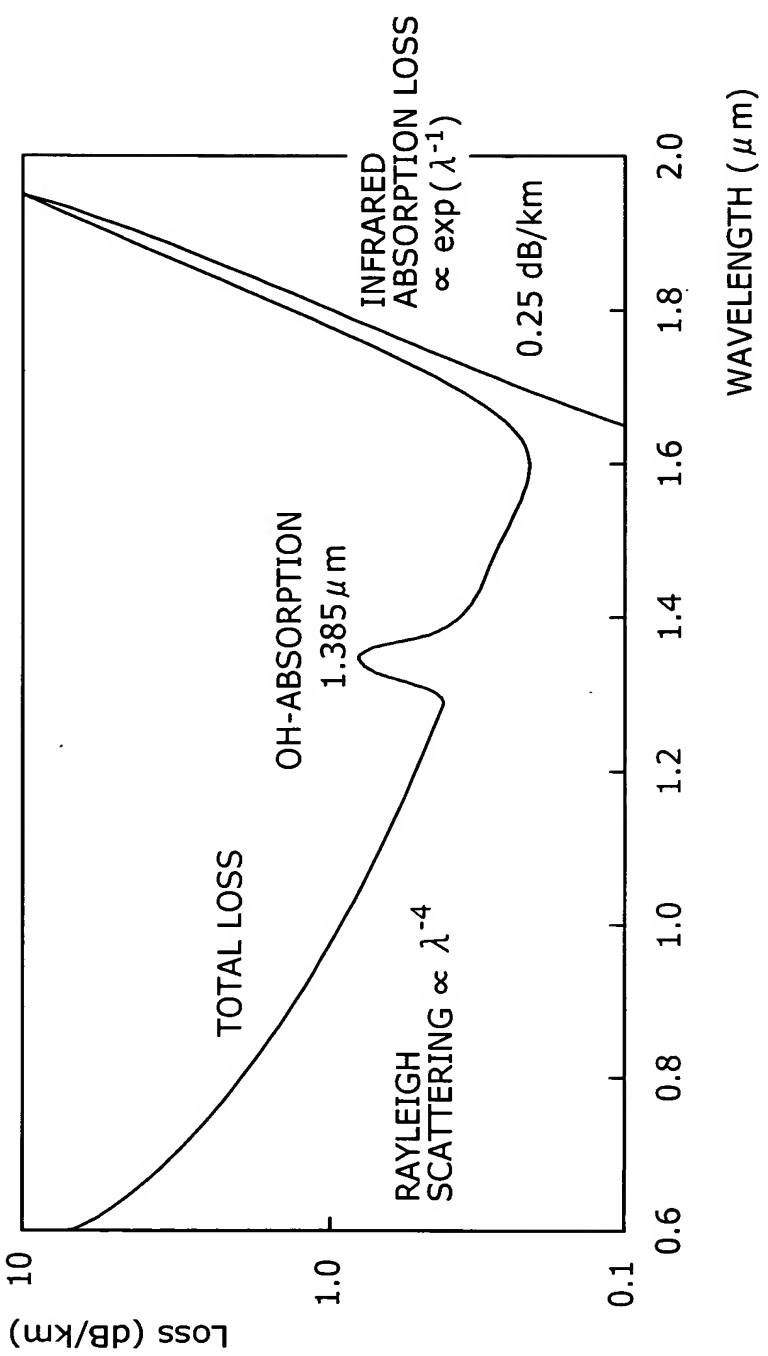
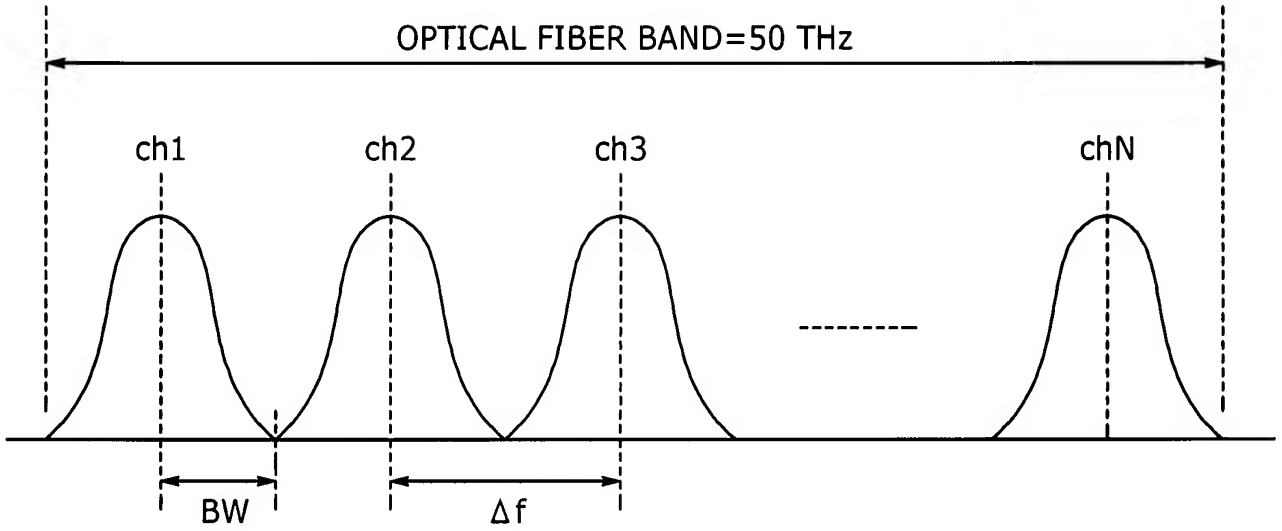


FIG. 5

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

BAND NAME	MEANING	WAVELENGTH RANGE
O BAND	Original	1260 nm to 1360 nm
E BAND	Extended	1360 nm to 1460 nm
S BAND	Short wavelength	1460 nm to 1530 nm
C BAND	Conventional	1530 nm to 1565 nm
L BAND	Long wavelength	1565 nm to 1625 nm
U BAND	Uitralong wavelength	1625 nm to 1675 nm

FIG. 6



(THROUGHPUT OF OPTICAL FIBER TRANSMISSION BETWEEN STATIONS)

$$\text{THROUGHPUT} = \text{NUMBER OF CHANNELS} \times \text{BIT RATE} = \frac{50\ \text{THz}}{2 \times \text{BW}} \times \text{BW} = 25\ \text{Tb/s}$$

BW CONSIDERED AS BIT RATE

MODULATION BAND

A THROUGHPUT OF 25 TBITS/S IS A THEORETICAL UPPER LIMIT FOR AN OPTICAL FIBER BAND OF 50 THZ. WITH LONG-DISTANCE TRANSMISSION BY AN OPTICAL FIBER, HOWEVER, ACTUAL THROUGHPUT WILL BE CONSIDERABLY LOWER THAN 25 TBITS/S DUE TO THE NONLINEAR EFFECTS.

FIG. 7

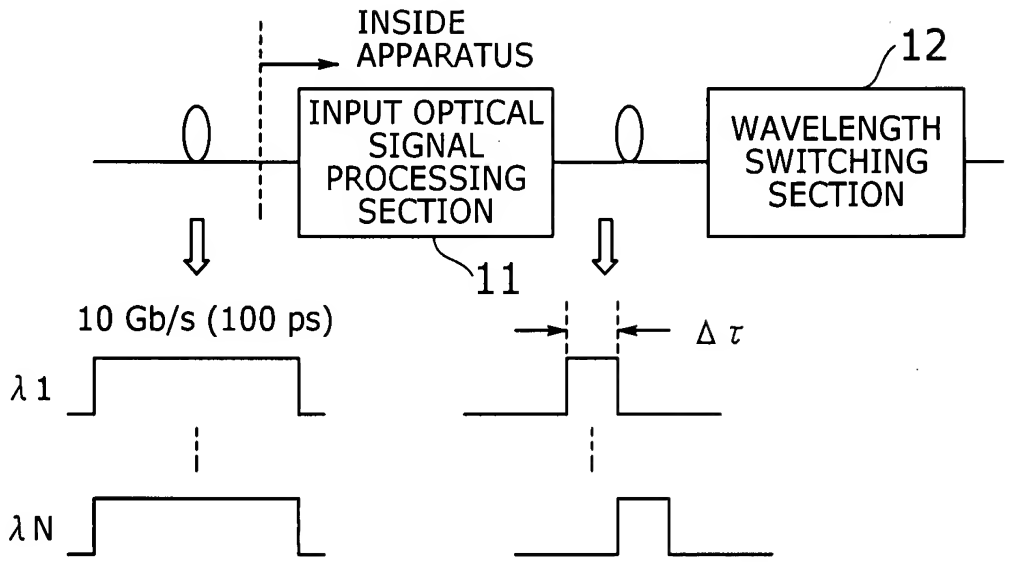


FIG. 8

(THROUGHPUT OF INTRA-APPARATUS OPTICAL FIBER TRANSMISSION)

$$\text{THROUGHPUT} = \text{NUMBER OF COMPRESSED PULSES} \times \text{BIT RATE OF ONE COMPRESSED PULSE}$$

$$= \frac{50\ \text{THz}}{2 \times \left(\frac{1}{\Delta\tau}\right)} \times \underbrace{\frac{100\ \text{ps}}{\Delta\tau}}_{\text{TIME DIVISION NUMBER}} \cdot 10\ \text{Gb/s} = 25\ \text{Tb/s}$$

$$= \frac{\text{BWfiber}}{2}$$

UNLIKE THE OPTICAL FIBER TRANSMISSION BETWEEN STATIONS, THE INTRA-APPARATUS OPTICAL FIBER TRANSMISSION IS SHORT DISTANCE TRANSMISSION, SO THE NONLINEAR EFFECTS HAVE NO INFLUENCE. THEREFORE, A THROUGHPUT OF 25 TBITS/S, BEING A THEORETICAL UPPER LIMIT, CAN BE ACHIEVED.

THE THROUGHPUT OF THE INTRA-APPARATUS OPTICAL FIBER TRANSMISSION MAY BE CALCULATED BY MULTIPLYING (OPTICAL FIBER BAND) AND (1/2) TOGETHER.

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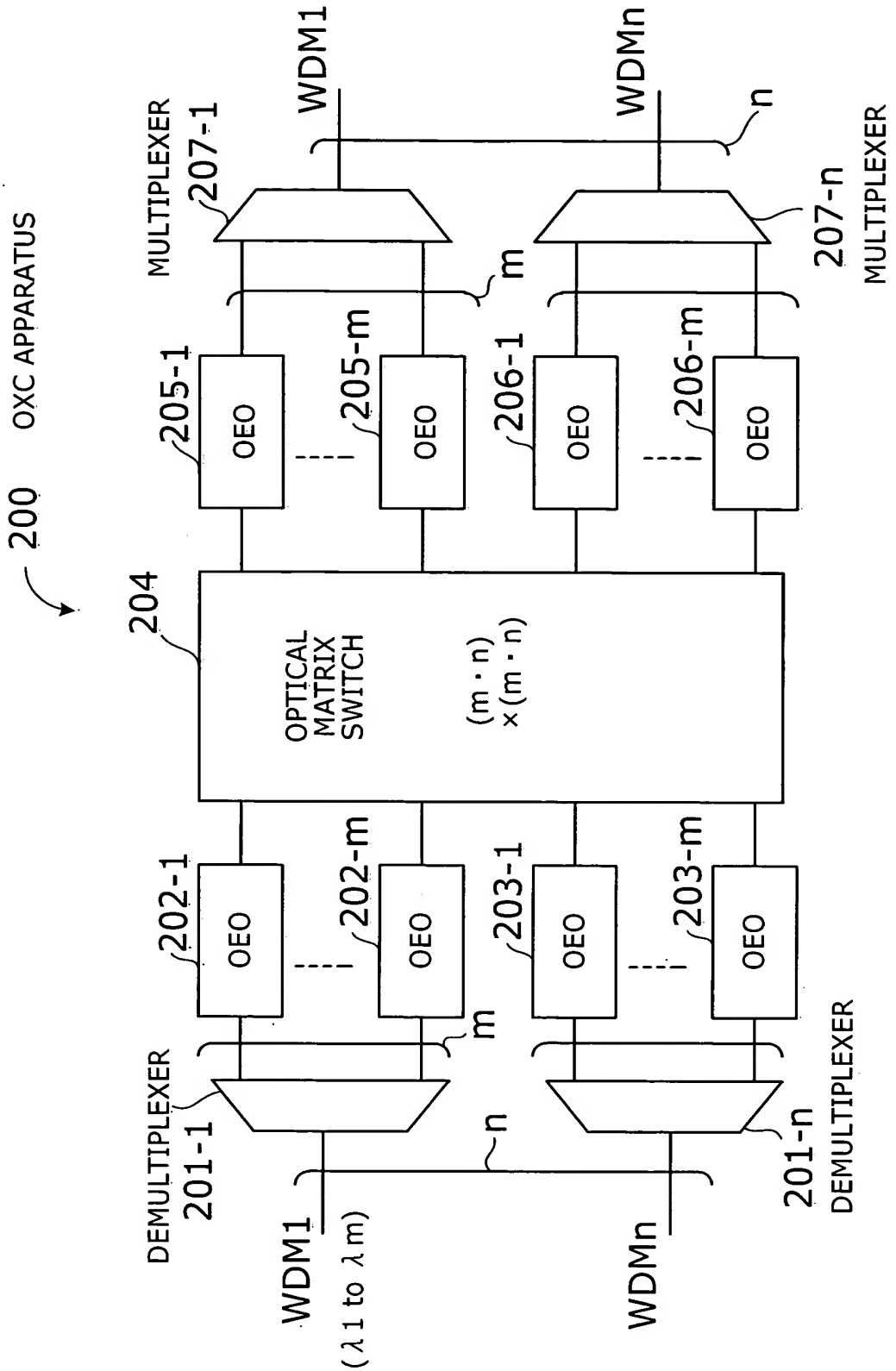

FIG. 9
PRIOR ART

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

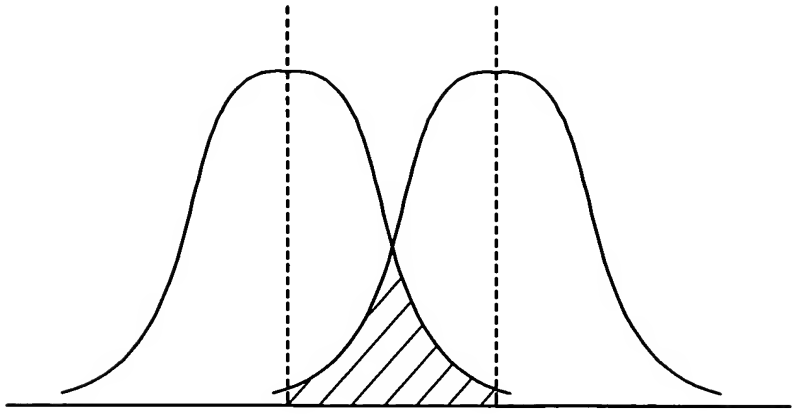

FIG. 10(A)

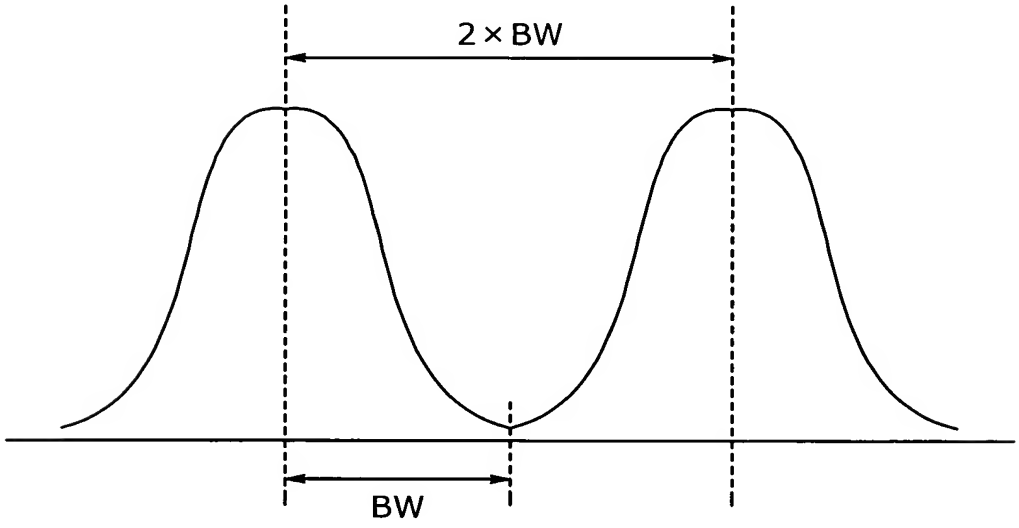

FIG. 10(B)

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
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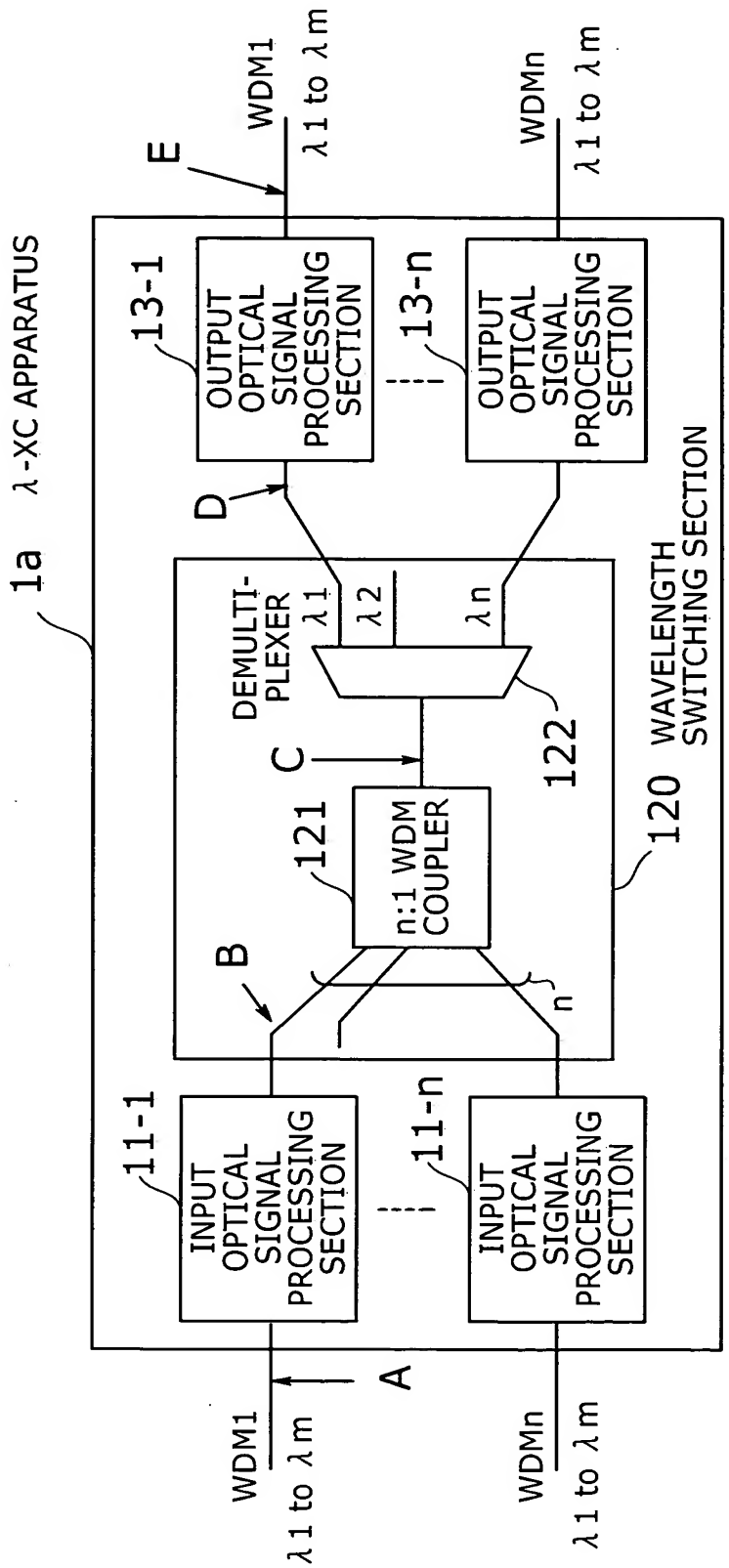

FIG. 11

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

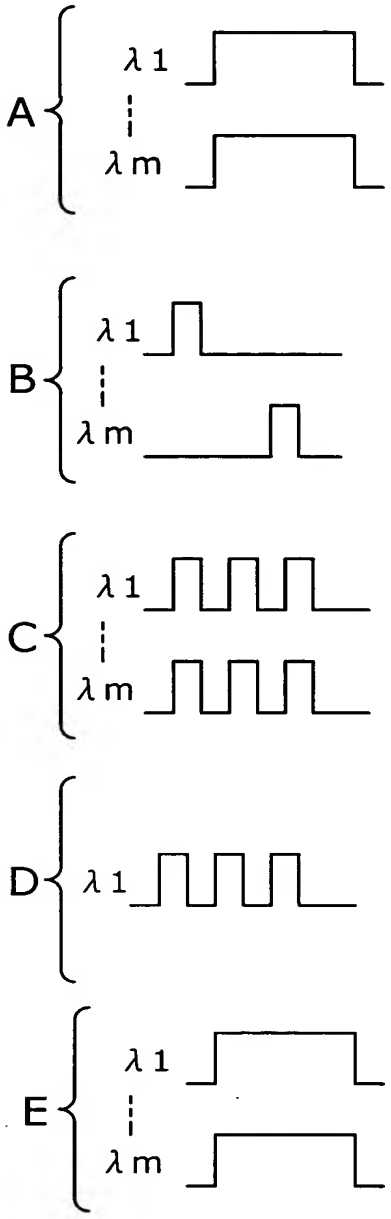

FIG. 12

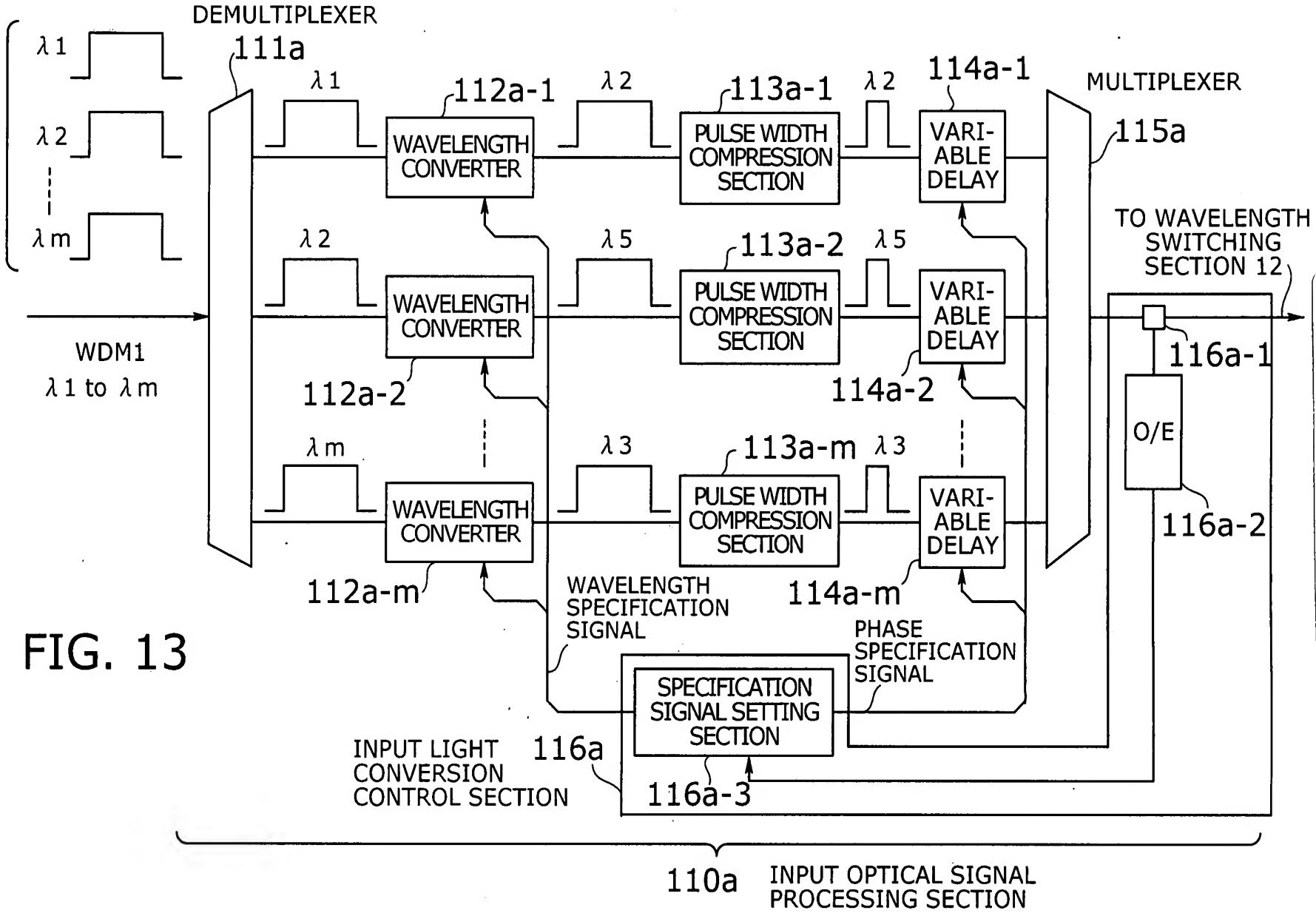

FIG. 13

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

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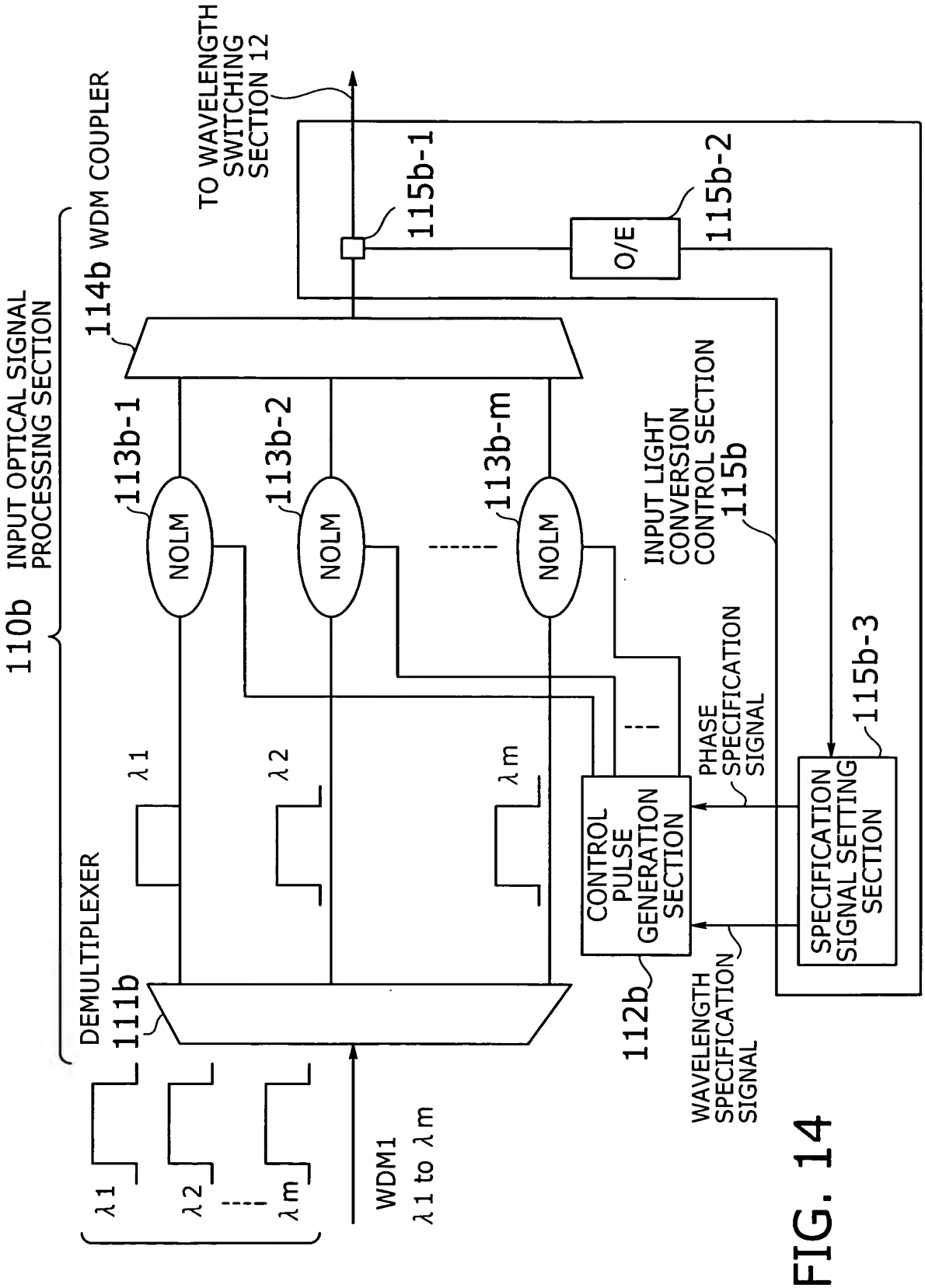


FIG. 14

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

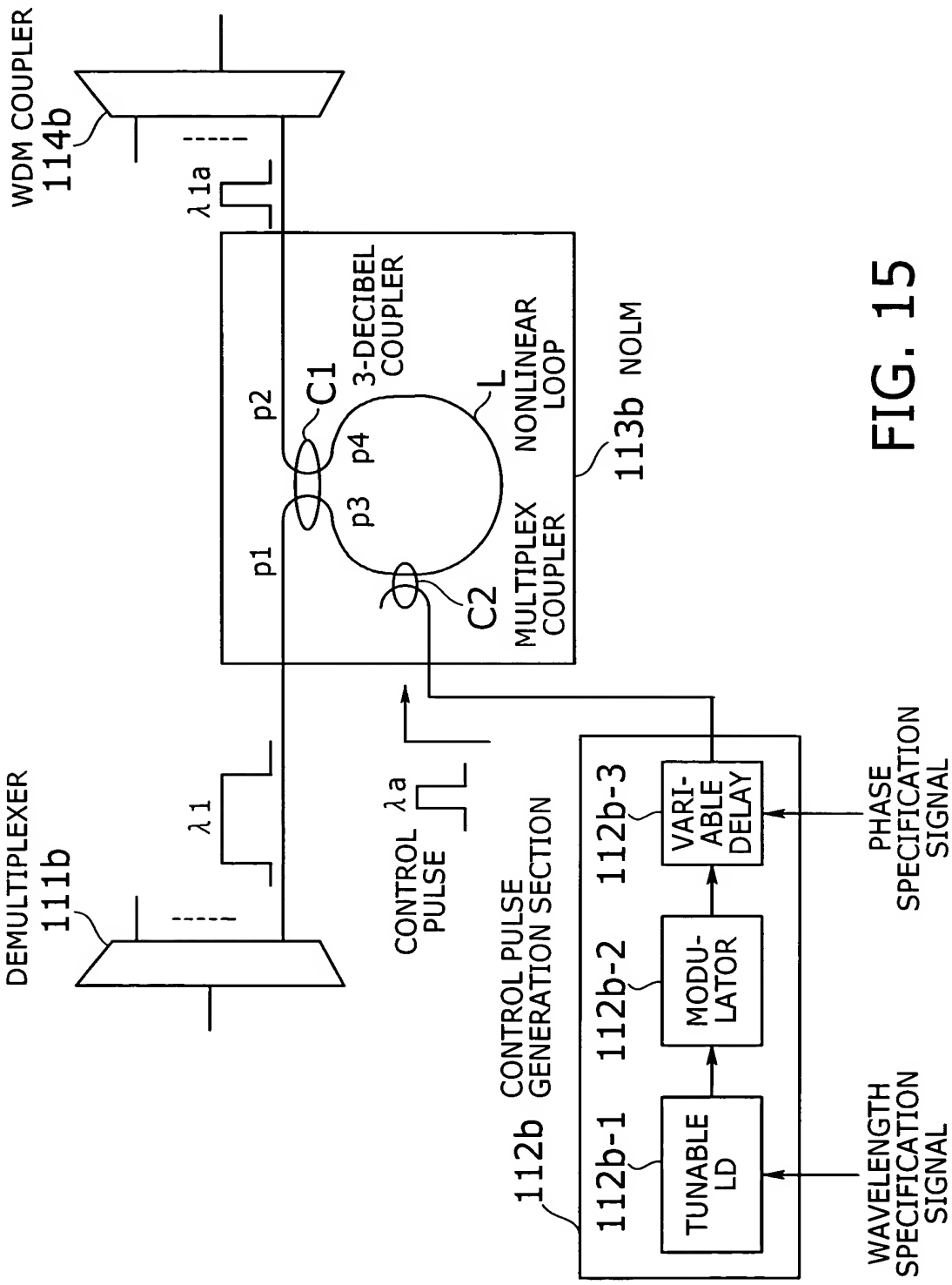


FIG. 15

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

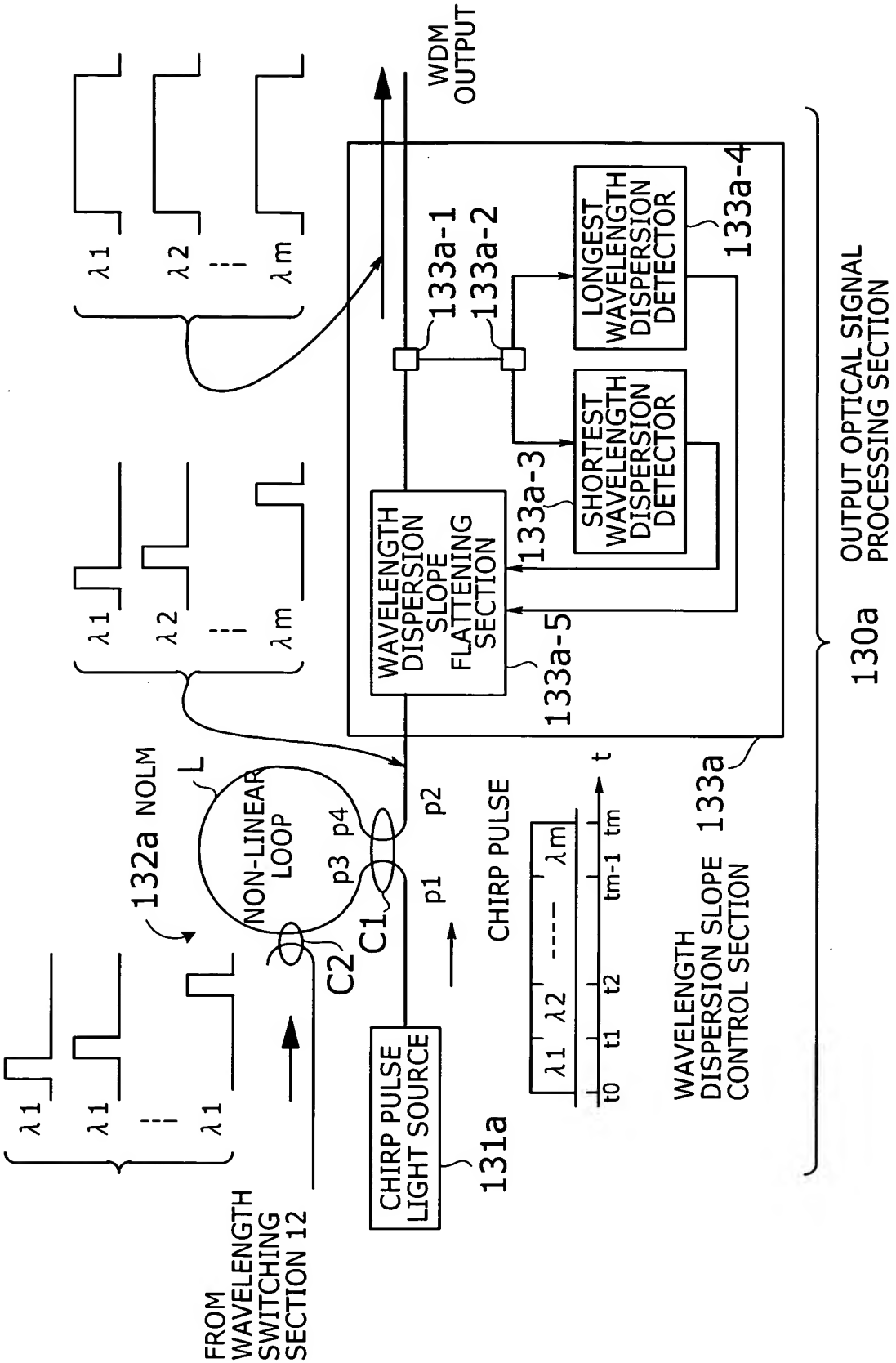
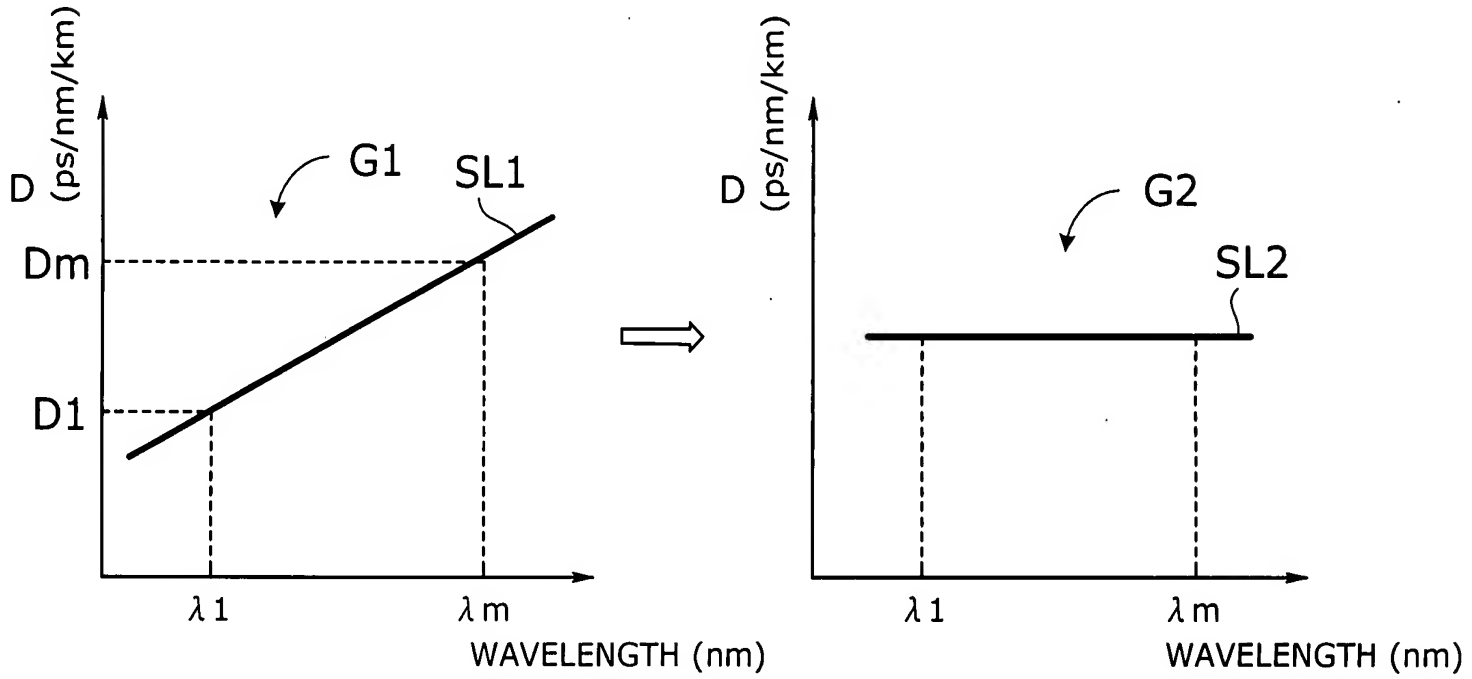


FIG. 16



BY FLATTENING A DISPERSION SLOPE BETWEEN $\lambda 1$ AND λm, THE PULSE WIDTHS OF THE $\lambda 1$ THROUGH λm SIGNALS ARE EXPANDED EQUALLY.

FIG. 17

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

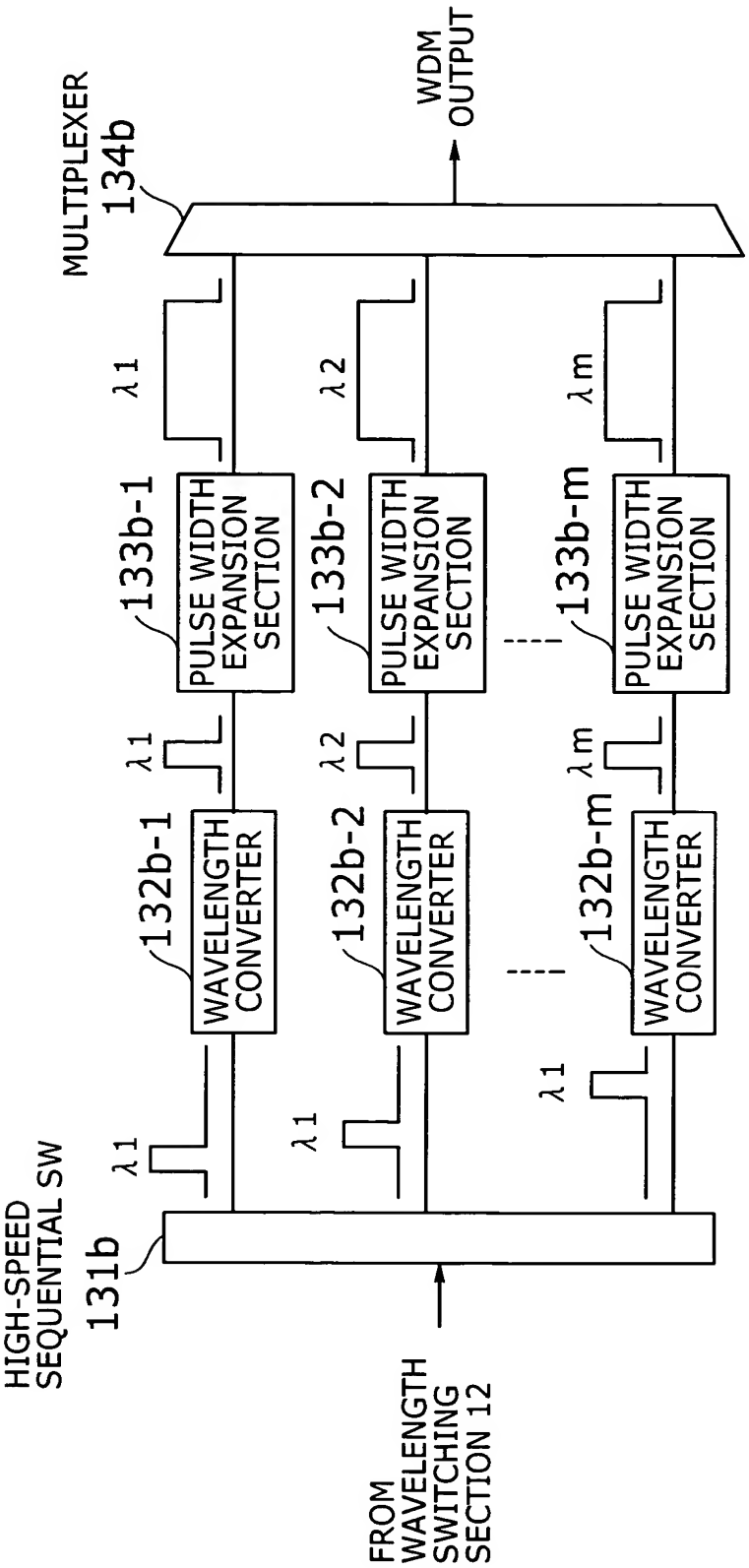


FIG. 18

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

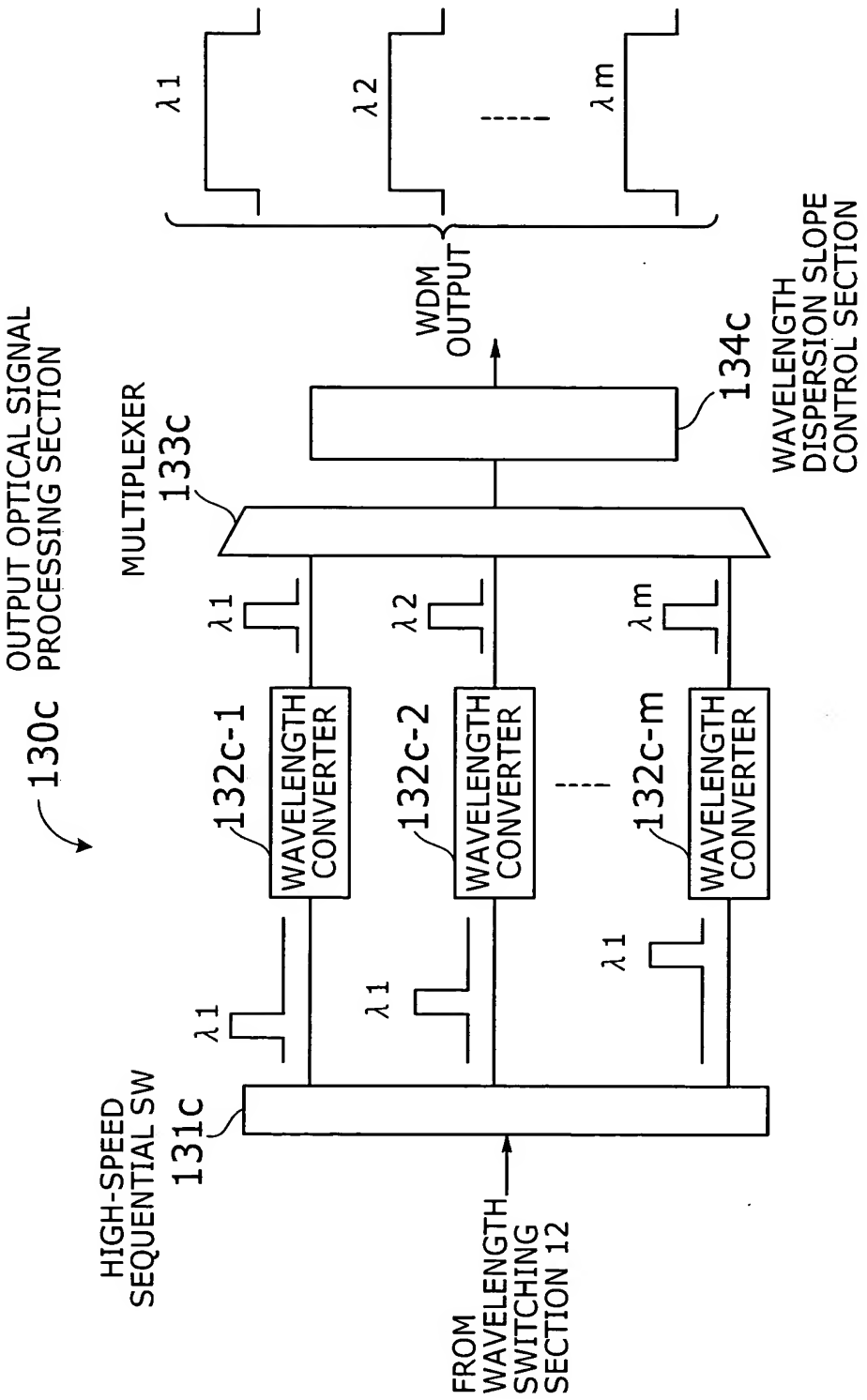


FIG. 19

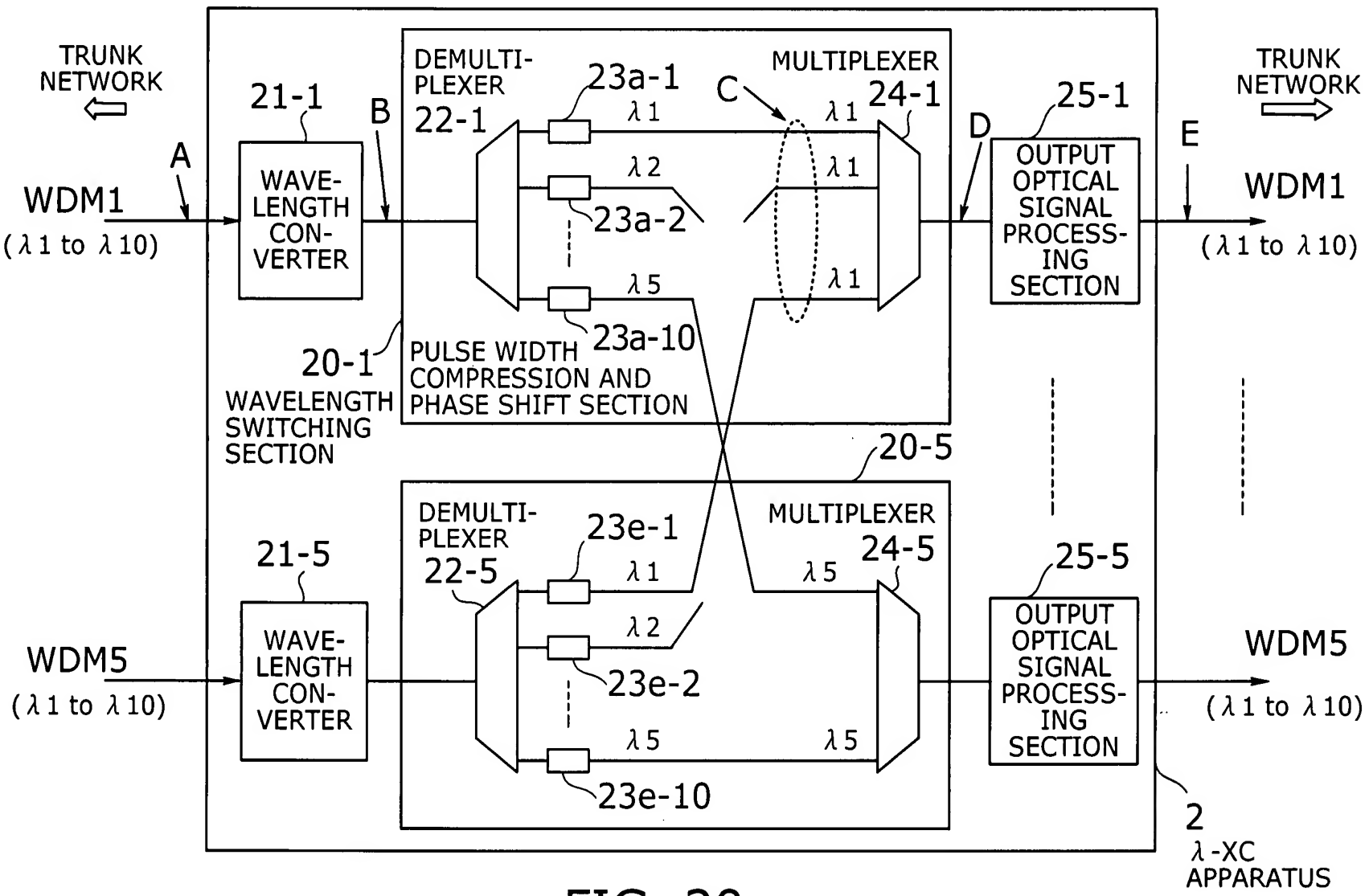
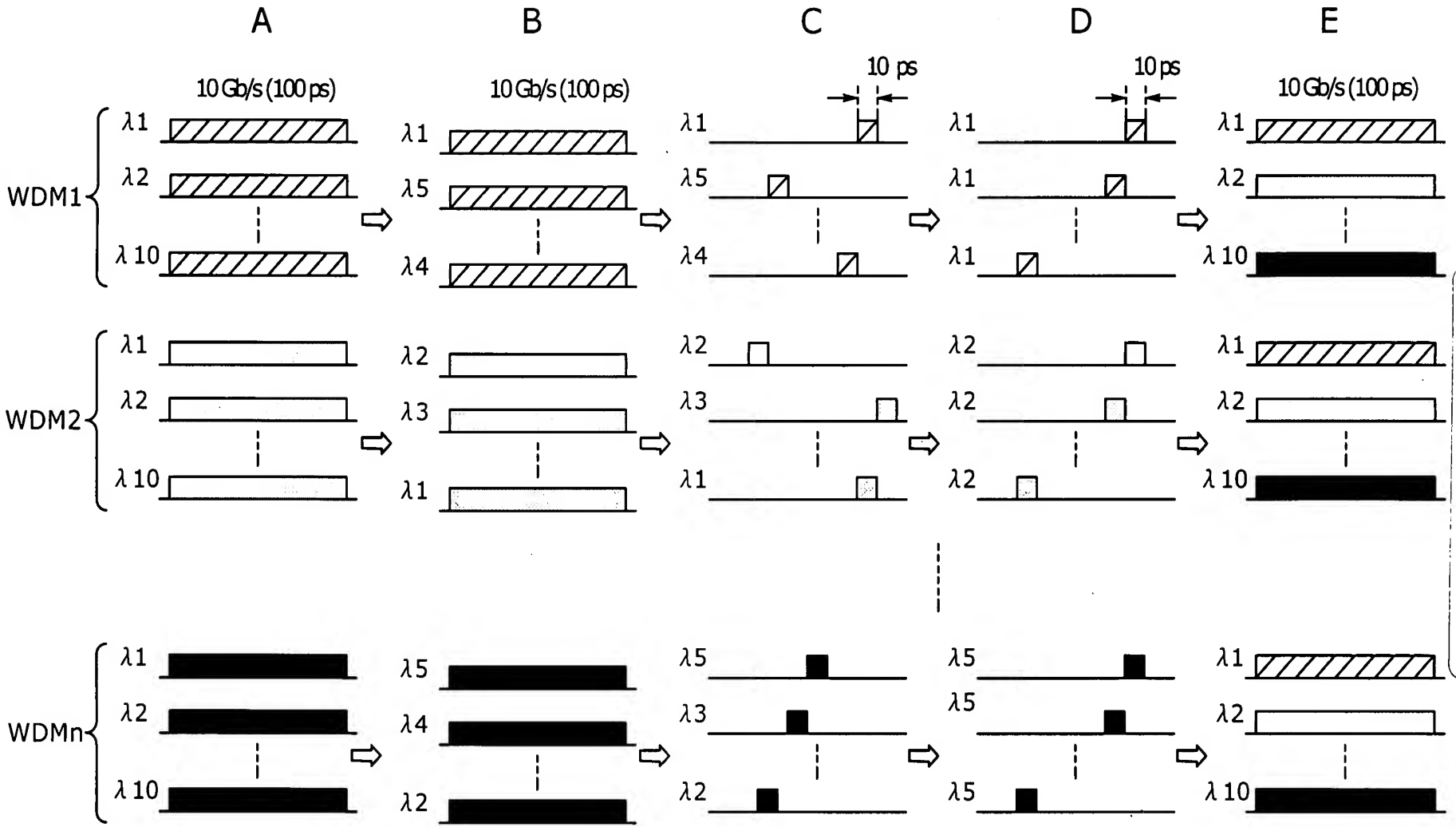


FIG. 20



TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

FIG. 21

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

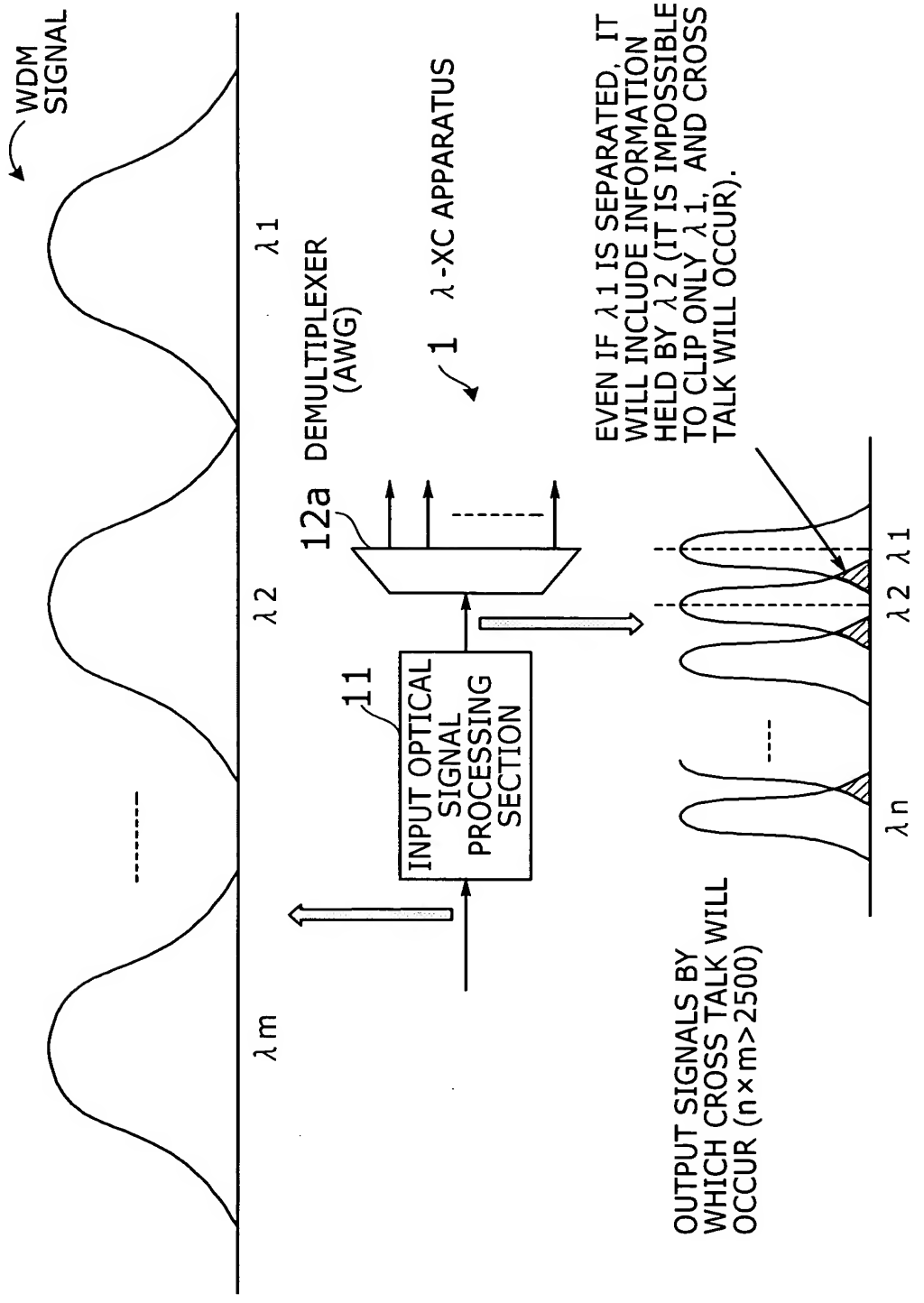


FIG. 22

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

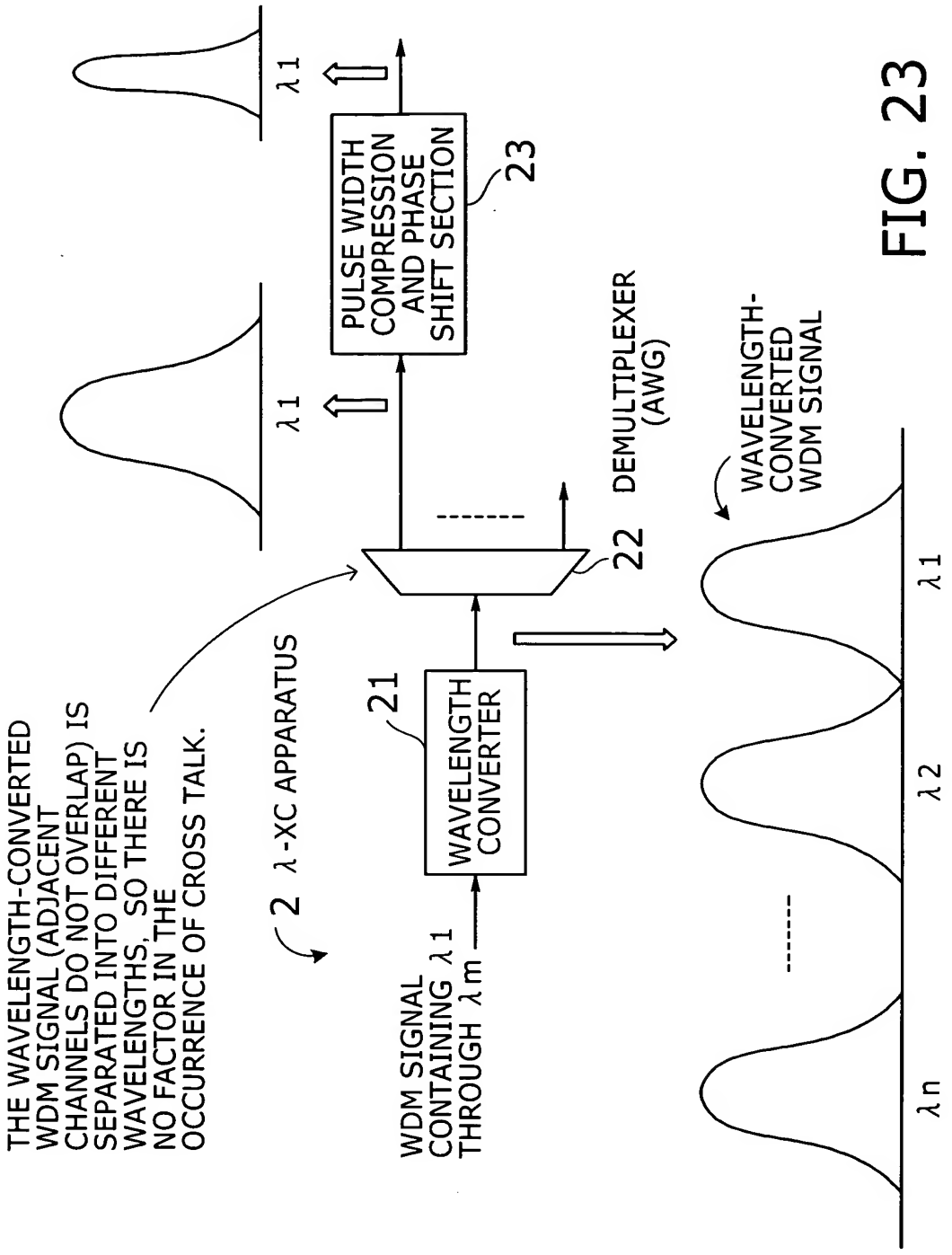
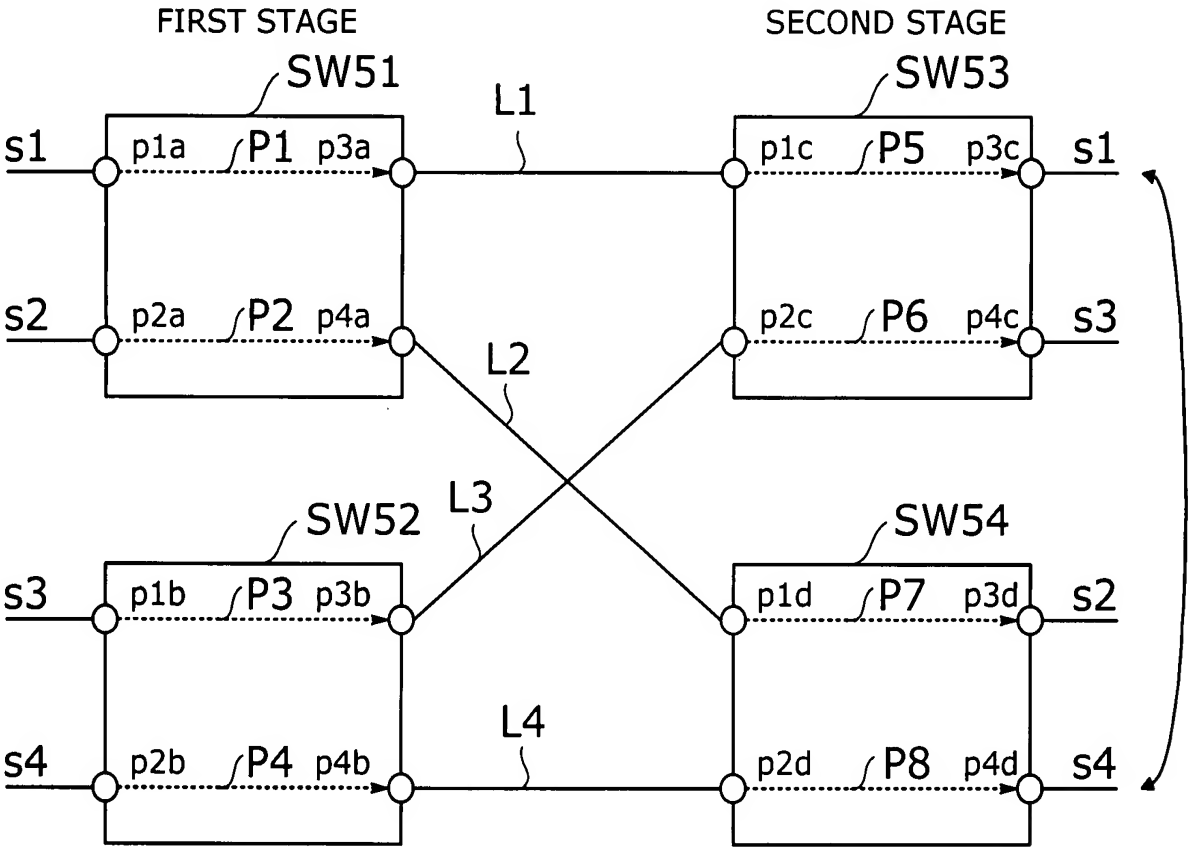


FIG. 23

WHEN OUTGOING LINES CORRESPONDING TO (m-1) INCOMING LINES HAVE BEEN ESTABLISHED IN AN m.TIMES.m SWITCH, THE DESTINATION OF THE REMAINING PATH IN A SWITCH WILL BE DETERMINED.



IT IS IMPOSSIBLE TO CHANGE ONLY THE ORDER IN WHICH THE SIGNALS s1 AND s4 ARE OUTPUTTED.

BLOCKING TYPE

FIG. 24

TITLE: OPTICAL CROSS-CONNECT APPARATUS
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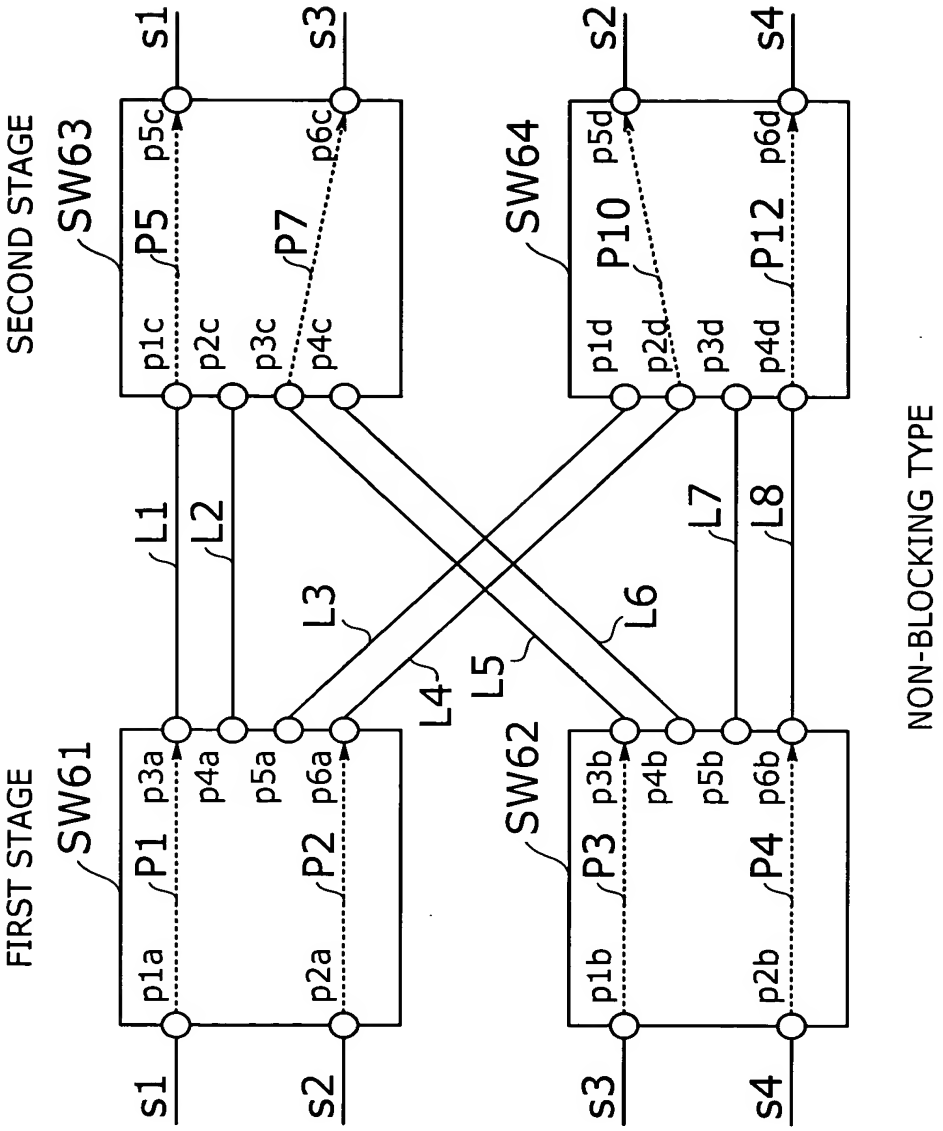

FIG. 25

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

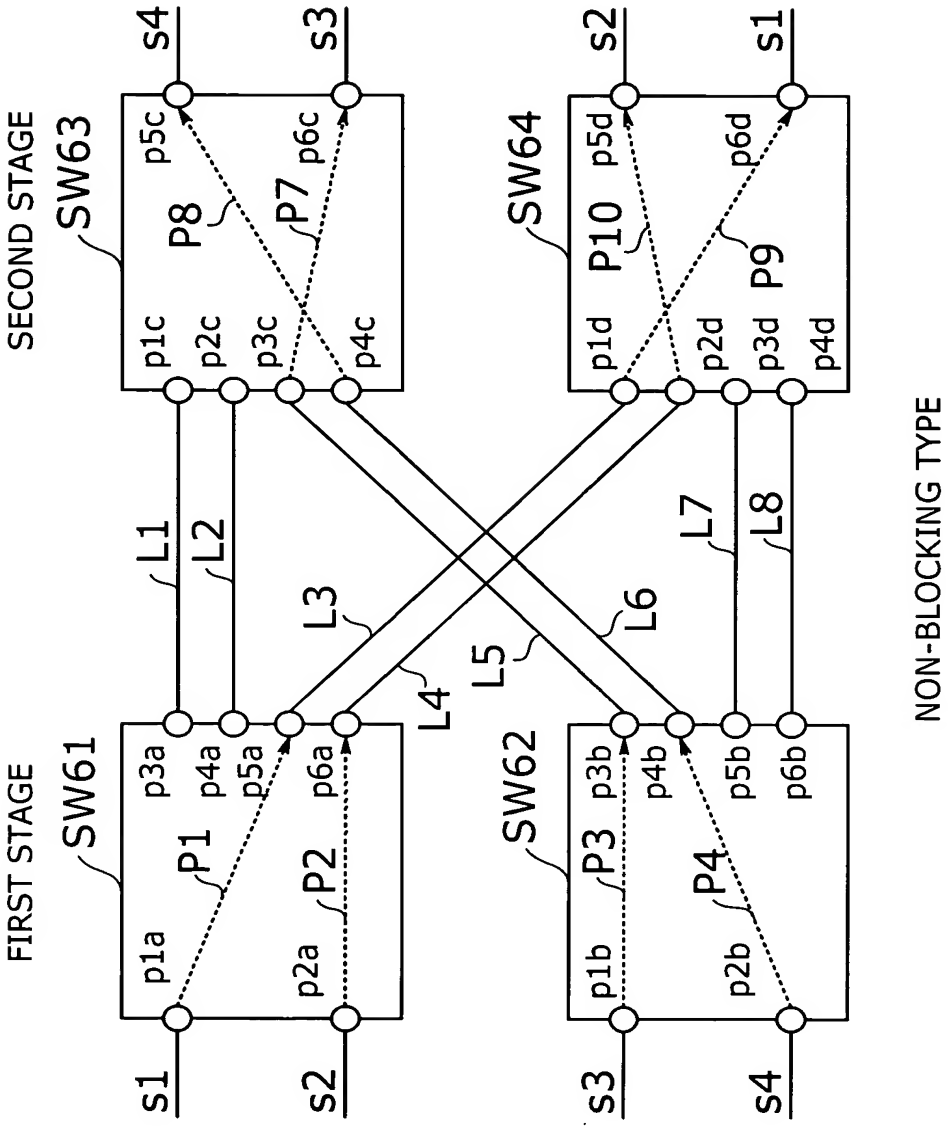

FIG. 26

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
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DOCKET NO.: 1095.1298

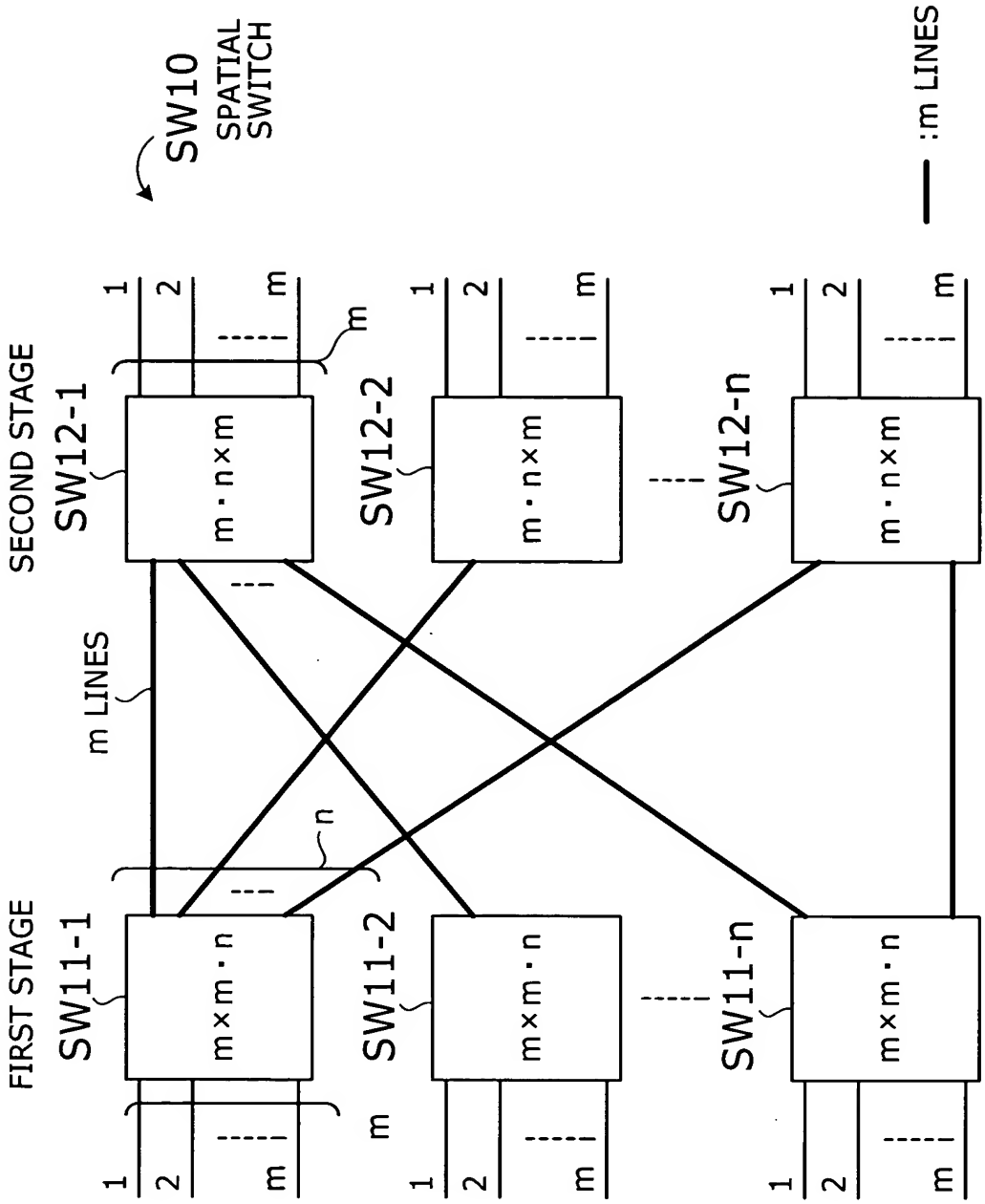

FIG. 27

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

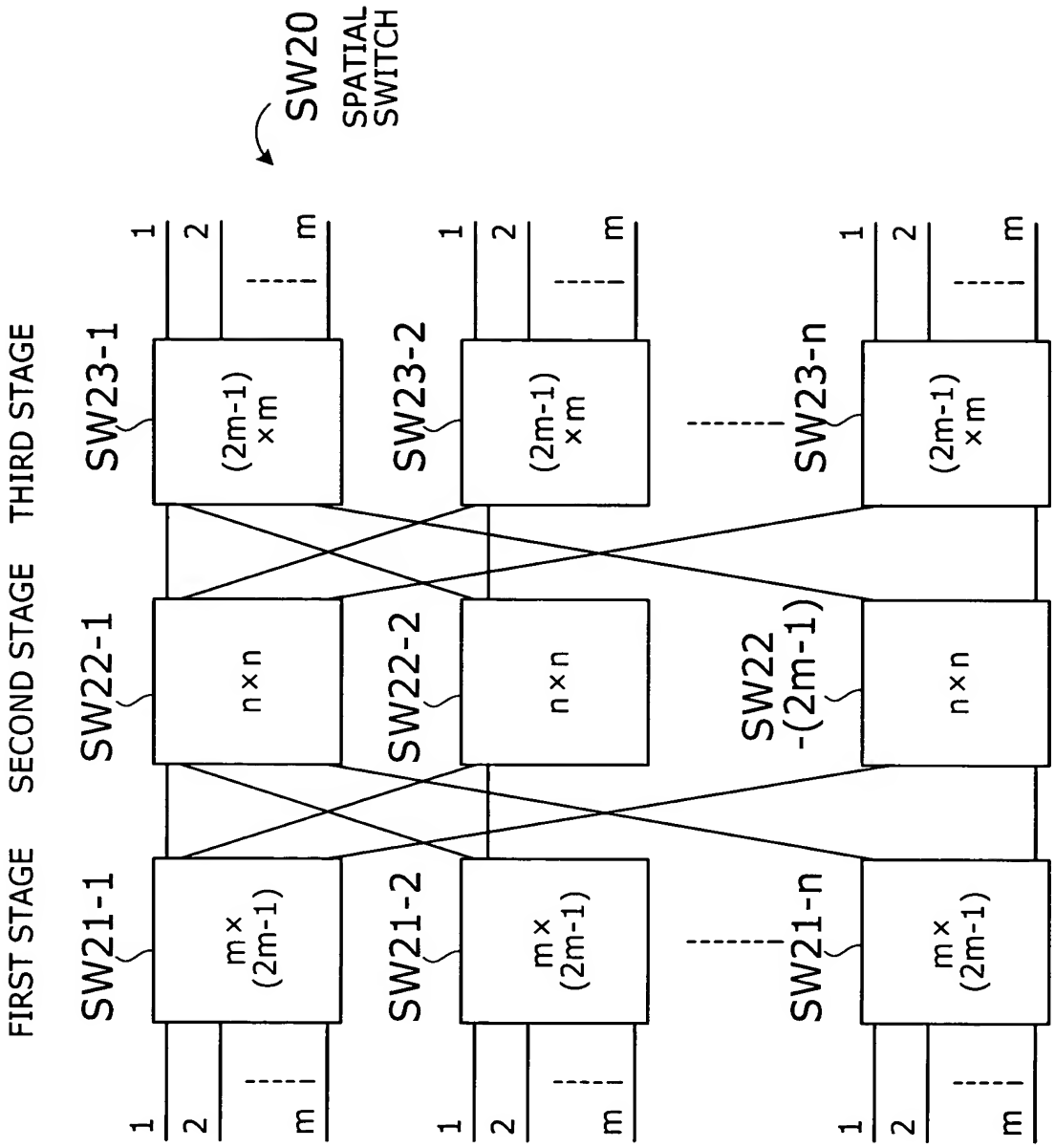

FIG. 28

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

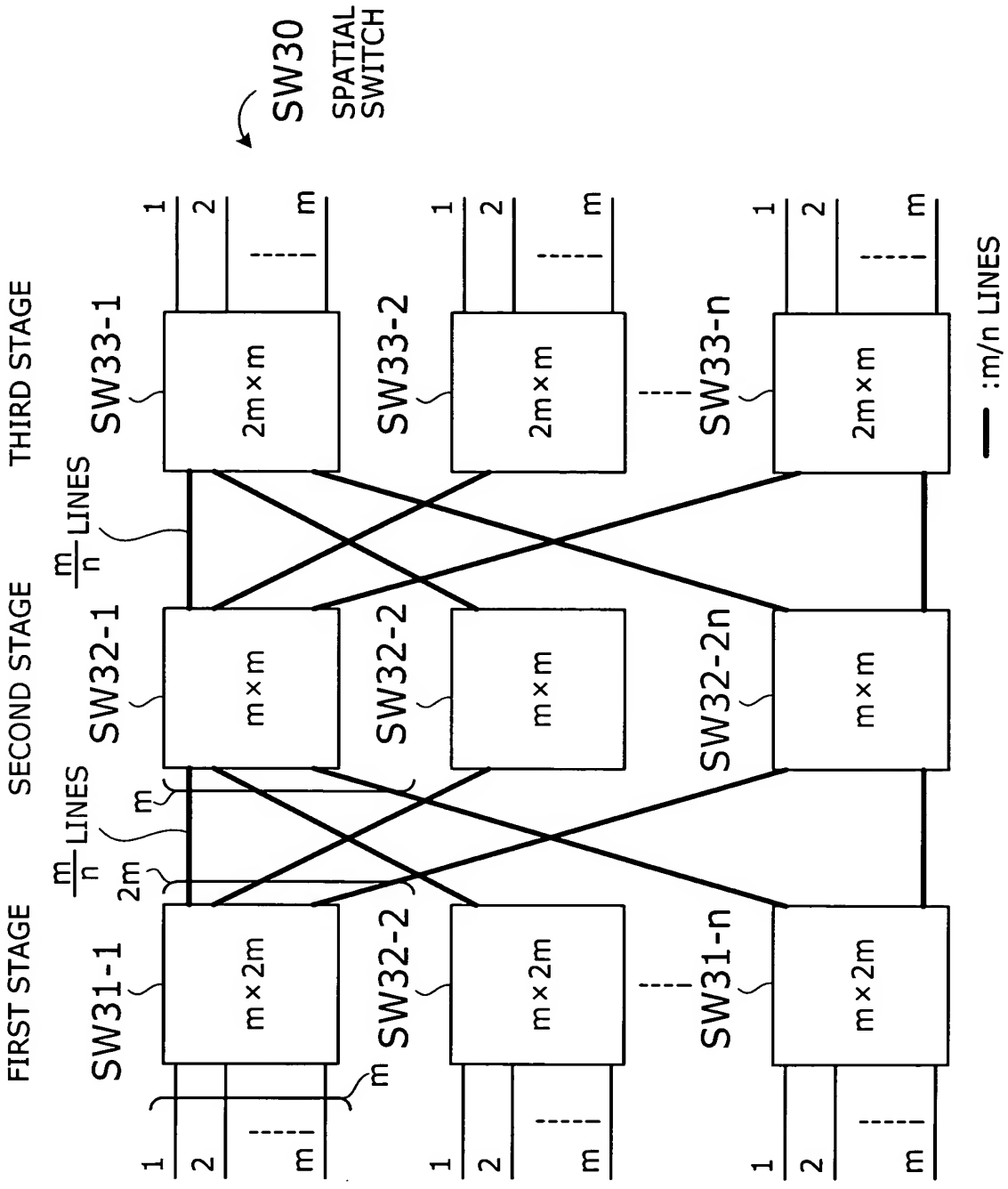

FIG. 29

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

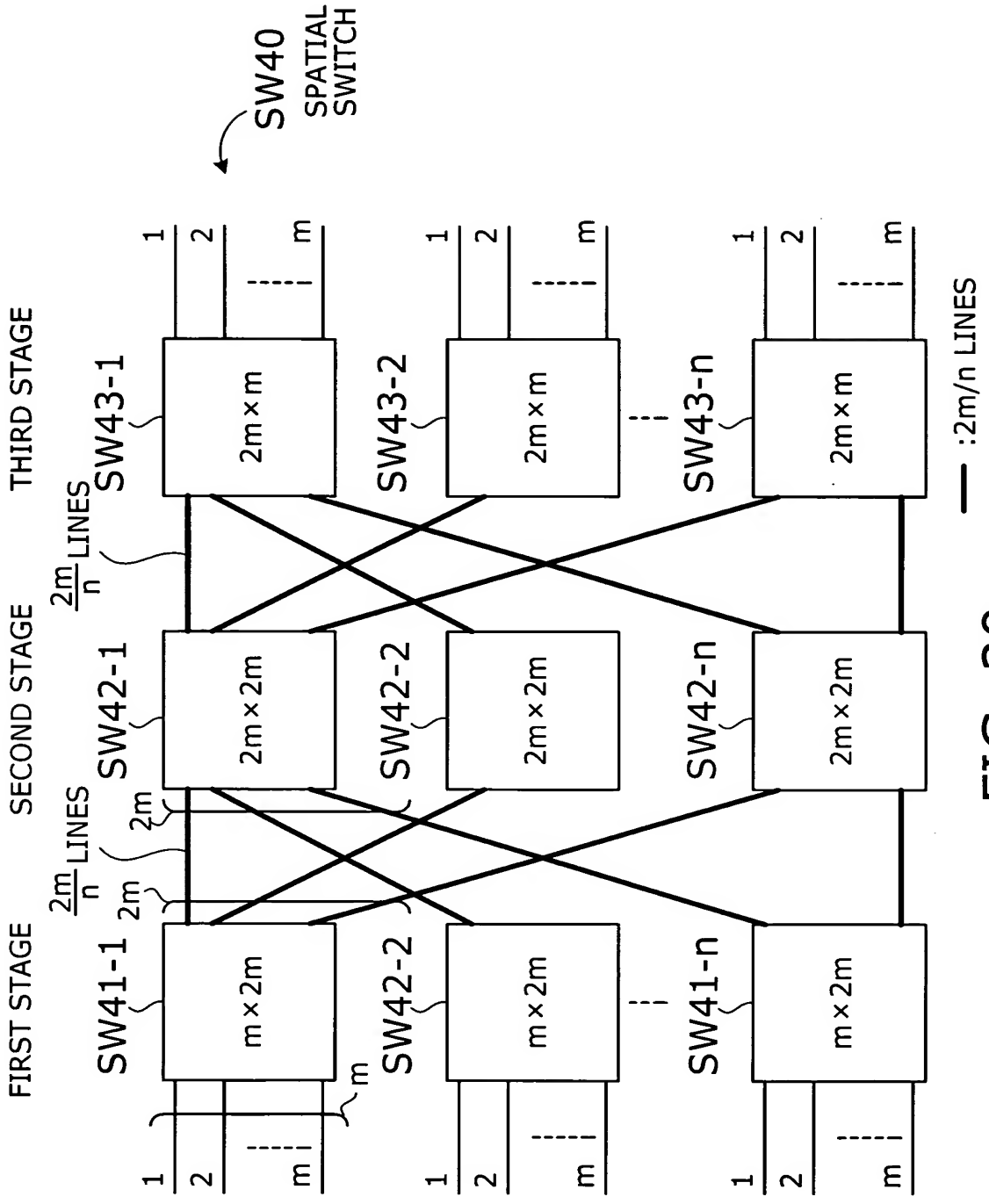

FIG. 30

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

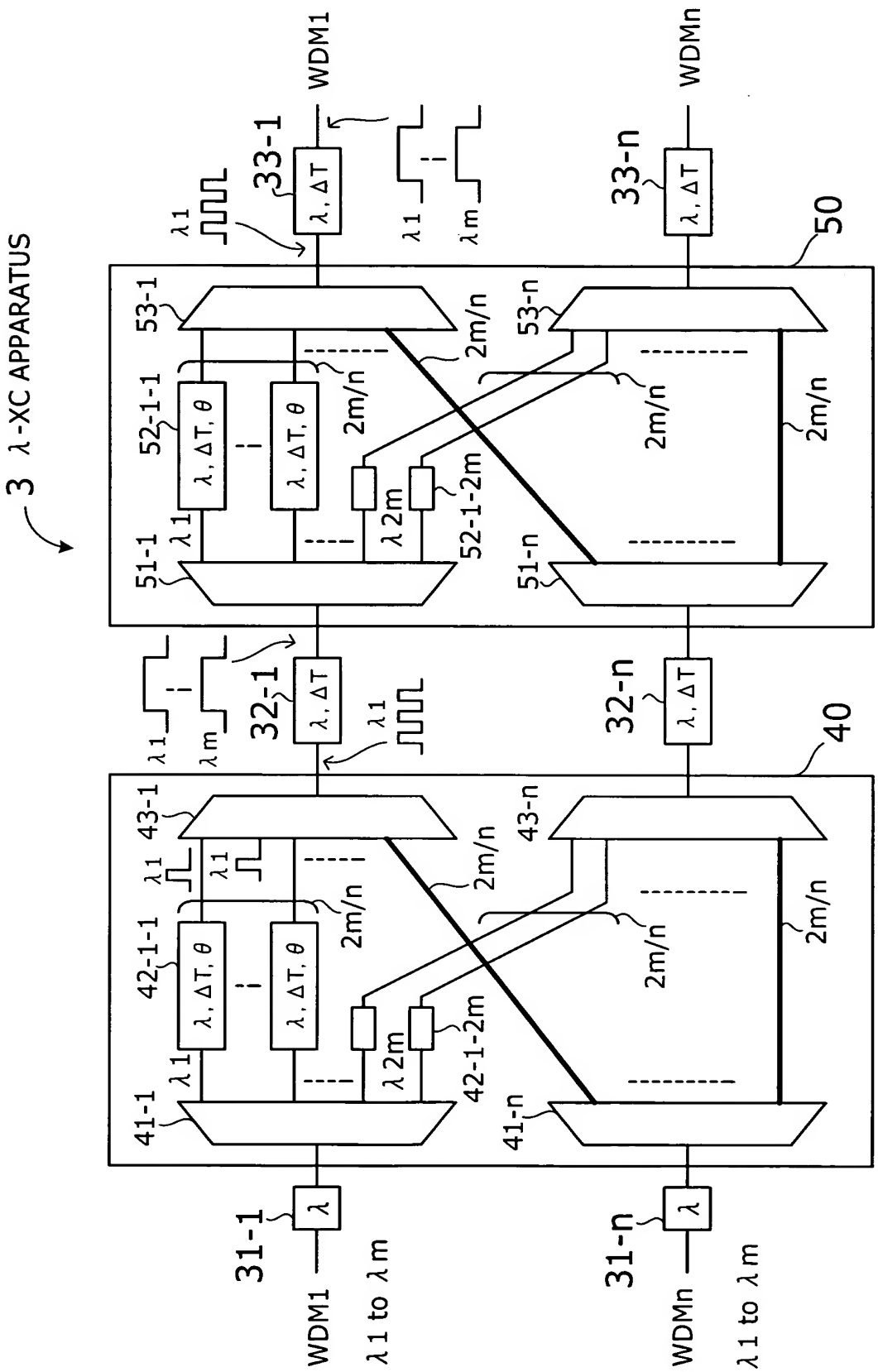

FIG. 31

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

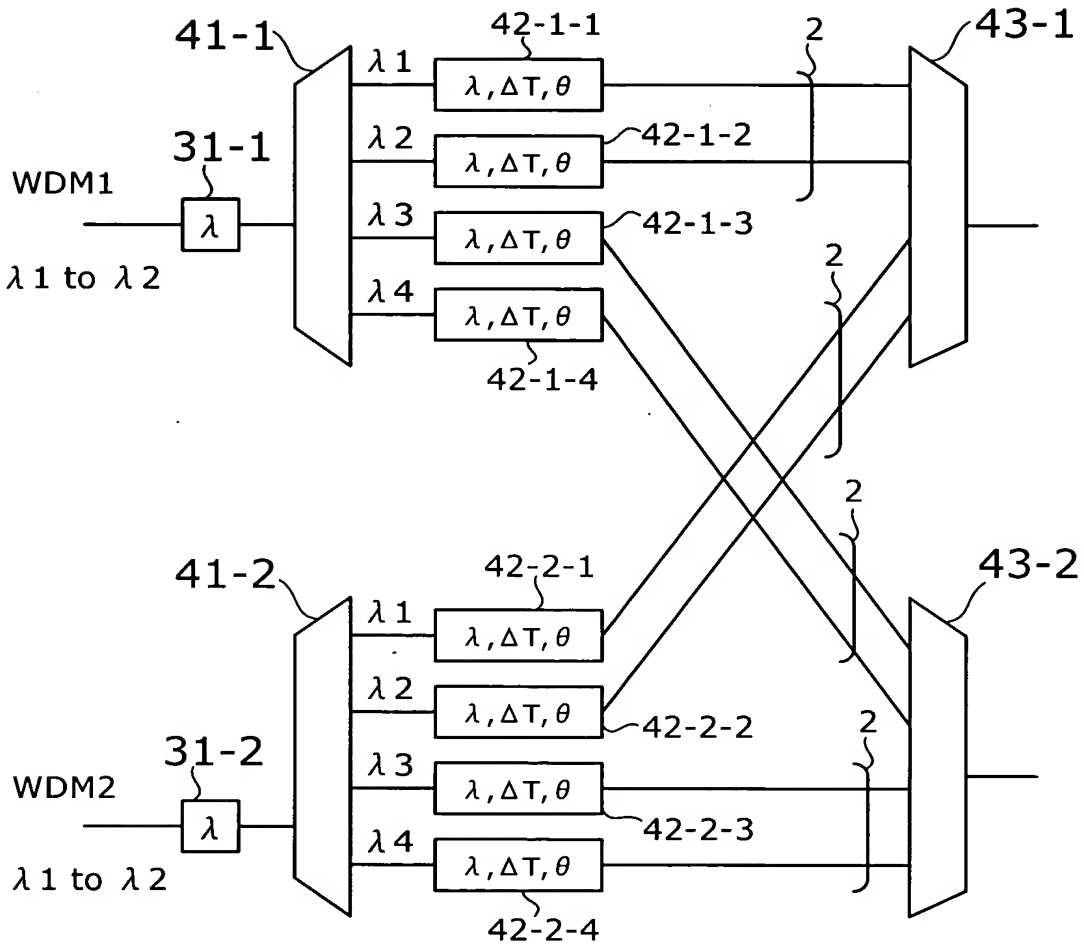

FIG. 32

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

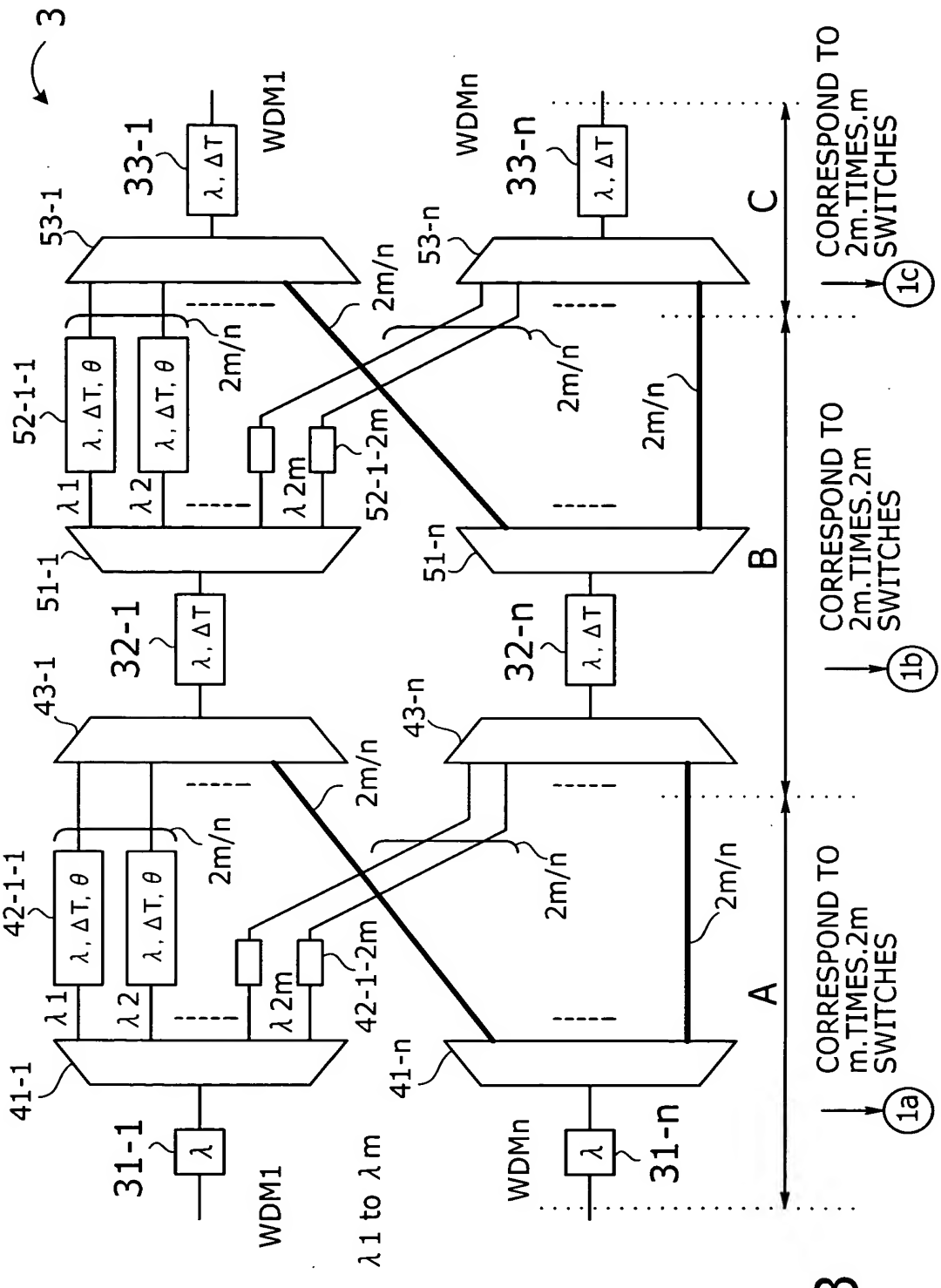

FIG. 33

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

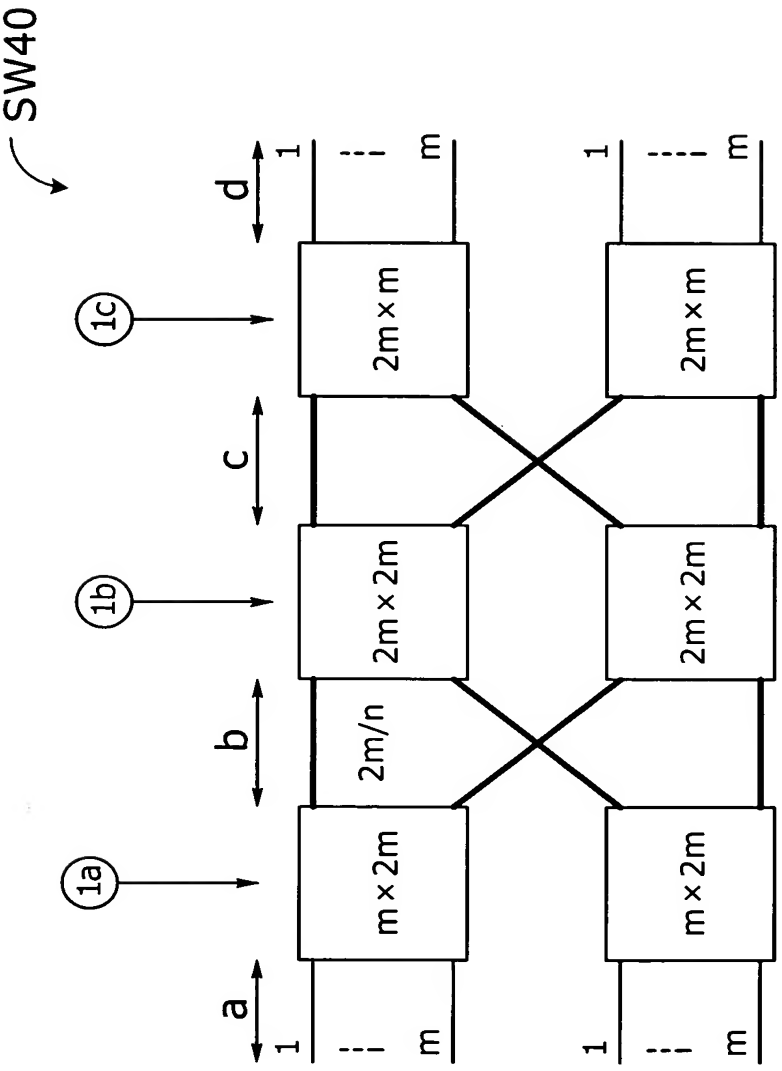

FIG. 34

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

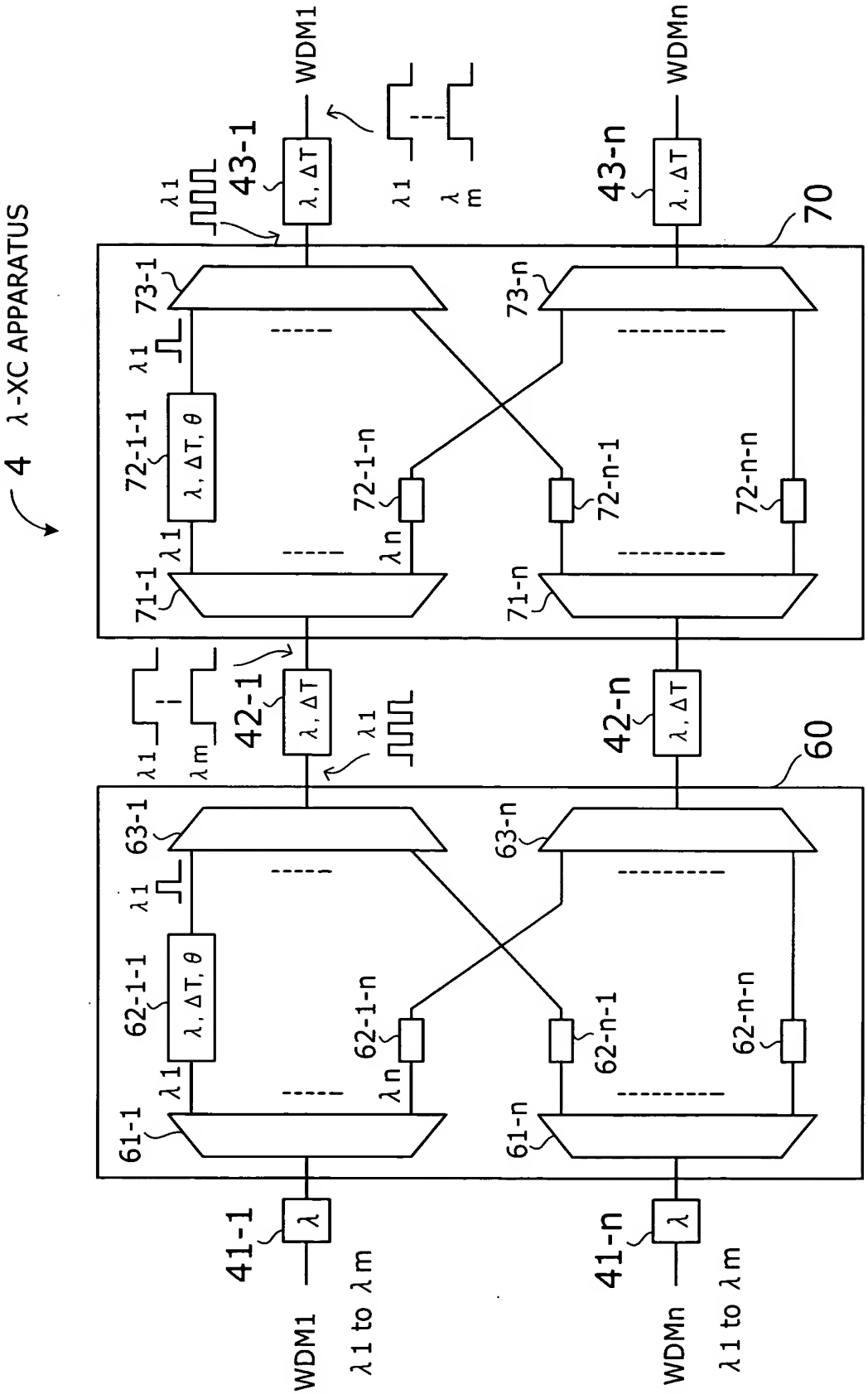

FIG. 35

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

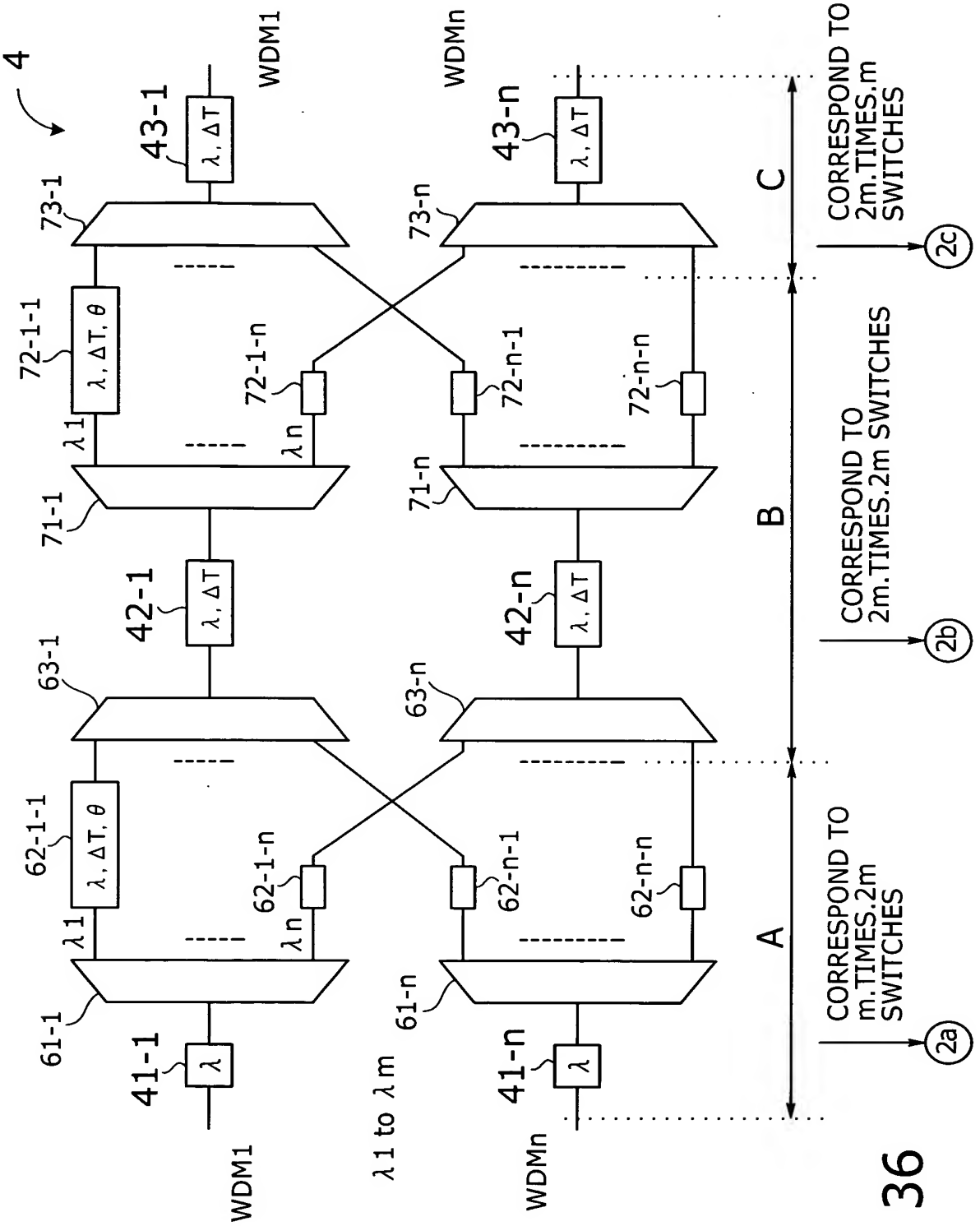

FIG. 36

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

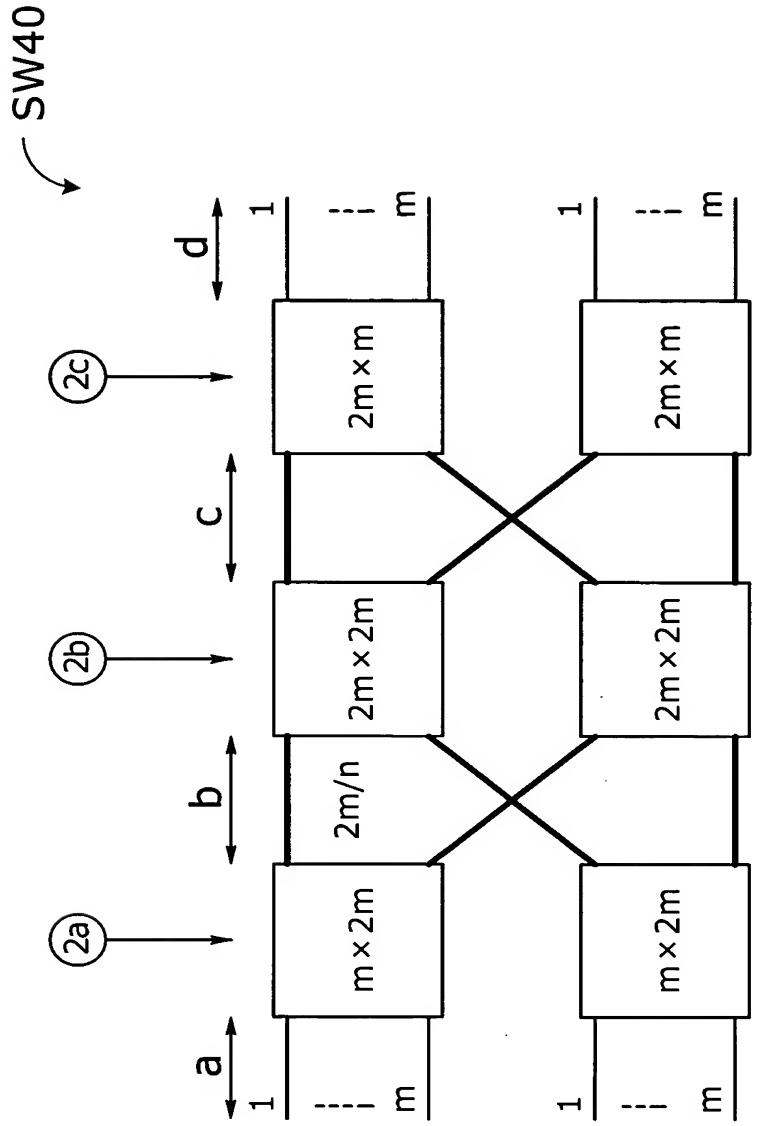

FIG. 37

TITLE: OPTICAL CROSS-CONNECT APPARATUS
INVENTORS: Yoichi OIKAWA et al.
SERIAL NO.:
DOCKET NO.: 1095.1298

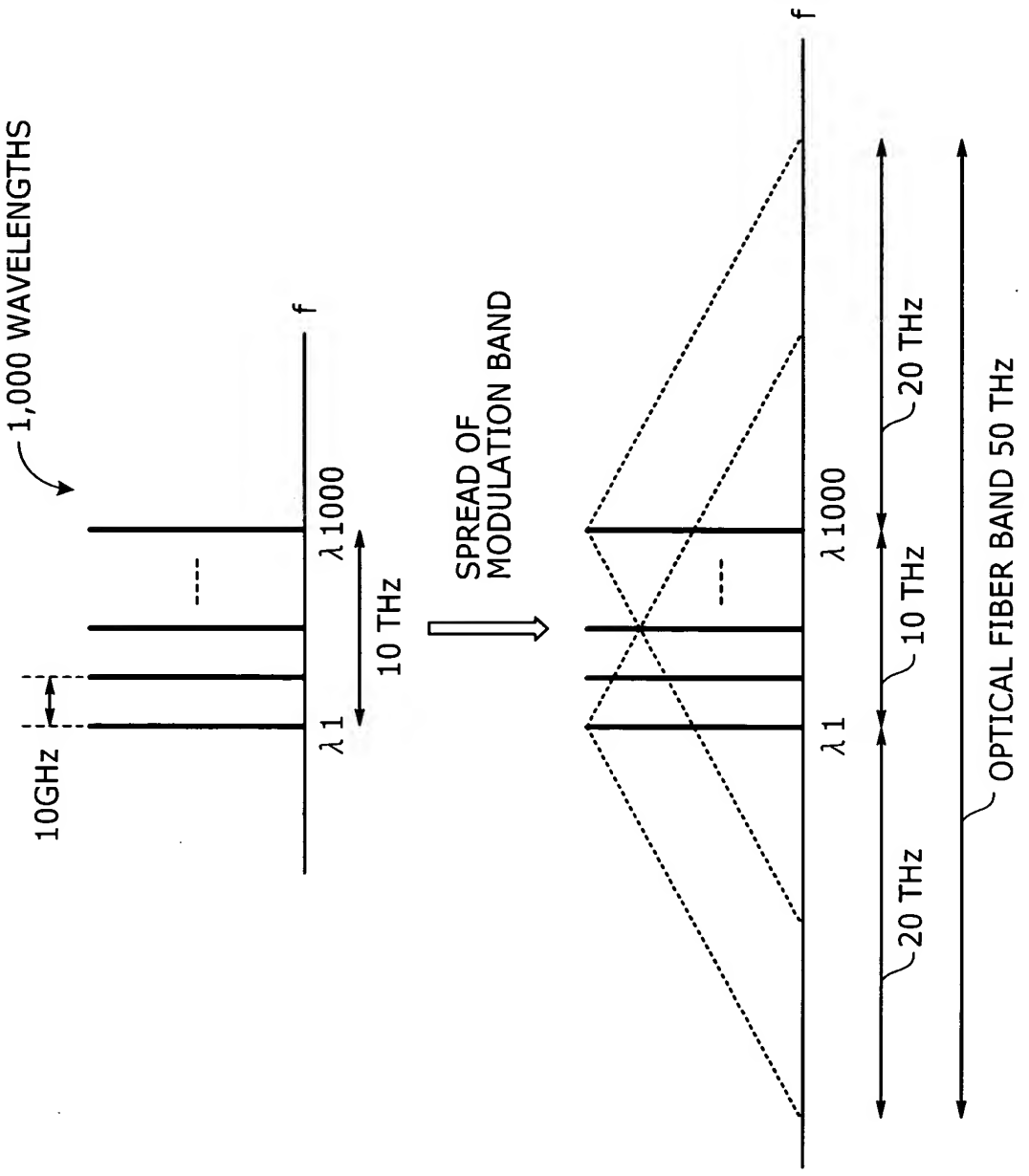

FIG. 38